LIBRARY
SUPREME COURT, U. S.

Office-Supreme Court, U.S.
FILED
MAY 23 1969
JOHN F. DAVIS, CLERK

IN THE

Supreme Court of the United States

October Term, 1968

No. 1424

THE EIMCO CORPORATION,

Petitioner,

v.

PETERSON FILTERS AND ENGINEERING COMPANY and KOMLINE-SANDERSON ENGINEERING CORPORATION,

Respondents.

PETITION FOR A WRIT OF CERTIORARI TO THE UNITED STATES COURT OF APPEALS FOR THE TENTH CIRCUIT

GRANVILLE M. BRUMBAUGH
MARK N. DONOHUE
Attorneys for Petitioner
90 Broad Street
New York, New York 10004
(212) 344-5888

Of Counsel:
BRUMBAUGH, GRAVES, DONOHUE & RAYMOND

TABLE OF CONTENTS

	PAGE
OPINIONS BELOW	2
JURISDICTION	2
QUESTIONS PRESENTED FOR REVIEW	2
CONSTITUTIONAL PROVISIONS AND STATUTES INVOLVED	4
STATEMENT OF THE CASE	4
Subject Matter Involved	5
Belt Discharge Filters	5
Filter Belt Alignment Problems	6
The Peterson Patent	7
The Issue Concerning Obviousness	7
The Issue Concerning the Scope of the Patent Claims	9
REASONS FOR GRANTING THE WRIT	13
1. The decision of the Court of Appeals upholds the monopoly of a patent which fails completely to meet the "nonobvious" requirement of 35 U.S.C. §103	13
2. The decision of the Court of Appeals accords to the Peterson patent claims a range of equivalents foreclosed to them by file wrapper estoppel	20
CONCLUSION	25

PAGE

APPENDIX

Constitutional Provision and Statutes Involved A1

Constitution
Article 1, Section 8 ..... A1

Statutes
35 United States Code §102(a) and (b) A1
35 United States Code §103 ..... A1

Opinion of the United States Court of Appeals for the Tenth Circuit A2

Findings of Fact and Conclusions of Law of the United States District Court for the District of Utah, Central Division A18

Judgment of the Court of Appeals for the Tenth Circuit A45

Judgment of the District Court A46

Peterson Patent 3,077,990 (Exhibit 1, R. 656) A48

Isometric View of Belt Filter Having 3-Roll Discharge System (Exhibit C, R. 780) A53

TABLE OF CASES AND AUTHORITIES

PAGE

Cases:

Altoona Theatres v. American Tri-Ergon Corp., 294 U.S. 477 (1935) 14, 18

A. & P. Tea Co. v. Supermarket Corp., 340 U.S. 147 (1950) 14, 18

Borg-Warner Corporation v. Paragon Gear Works, Inc., 355 F.2d 400 (1st Cir. 1965) 4, 24

Exhibit Supply Co. v. Ace Corp., 315 U.S. 126 (1942) 3, 4, 12, 21, 22, 23, 24

Graham v. John Deere Co., 383 U.S. 1, 17, 18 (1966) 3, 9, 13, 14, 17, 20

Hotchkiss v. Greenwood, 11 How. 248 (1850) 14

Imhaeuser v. Buerk, 101 U.S. 647, 656 (1879) 16

Keating v. Stearnes Imperial Co., 347 F.2d 444 (7th Cir. 1965) 4, 23

Kenney Mfg. Co. v. J. L. Mott Iron Works, 137 F. 431, 433 (S.D.N.Y. 1905) 16

Lincoln Co. v. Stewart-Warner Corp., 303 U. S. 545 (1938) 14, 18

McCullough Tool Company v. Well Surveys, Inc., 343 F.2d 381 (10th Cir. 1965) 24

Parke, Davis & Co. v. American Cyanamid Co., 207 F.2d 561 (6th Cir. 1953) 4, 23, 24

Powder Power Tool Corp. v. Powder Actuated Tool Co., 230 F.2d 409 (7th Cir. 1956) 4, 23, 24

PAGE

Sinclair Co. v. Interchemical Corp., 325 U.S. 327 (1945) 14, 18

Technograph Printed Circuits Ltd. v. Bendix Aviation Corp., 218 F. Supp. 1, 24 (Md. 1963); affirmed, per curiam, 327 F.2d 497 (4th Cir. 1964) 15

28 U.S.C. §1254(1) 2

Rule 19-1(b) of the Rules of the Supreme Court 2

35 U.S.C. §103 ..... 4, 9, 13, 14, 17, 20

Constitution of the United States, Article I, Section 8, Clause 8 4

35 U.S.C. §§102 (a) and (b) 4, 9, 20

IN THE

Supreme Court of the United States

October Term, 1968

No.

THE EIMCO CORPORATION,

Petitioner,

v.

PETERSON FILTERS AND ENGINEERING COMPANY and KOMLINE-SANDERSON ENGINEERING CORPORATION,

Respondents.

PETITION FOR A WRIT OF CERTIORARI TO THE UNITED STATES COURT OF APPEALS FOR THE TENTH CIRCUIT

Petitioner, The Eimco Corporation, prays that a writ of certiorari issue to review the judgment of the United States Court of Appeals for the Tenth Circuit entered in this cause on December 30, 1968, holding valid and infringed Peterson United States Patent No. 3,077,990 for Filter Medium Guide.

Opinions Below

The opinion of the Court of Appeals is not as yet officially reported (but see 160 USPQ 182) (A2-17).[1] The District Court's Findings of Fact and Conclusions of Law (filed in lieu of an opinion) are not as yet officially reported (but see 155 USPQ 89) (A18-44). The Judgments of the Court of Appeals and of the District Court appear at A45 and A46, respectively.

Jurisdiction

The judgment of the Court of Appeals is dated and was entered December 30, 1968. A timely petition for rehearing, filed January 20, 1969, was denied on March 17, 1969. Jurisdiction of this Court is invoked under 28 U.S.C. §1254(1) in the light of Rule 19-1(b) of the Rules of the Supreme Court of the United States.

Questions Presented for Review

Two principal questions are presented:

1. Whether a patent for a combination of apparatus meets the "nonobviousness" requirement of 35 U.S.C. §103 where the sole element (and its function) of the claimed combination not found in the prior art is a spring used (for the purpose for which all springs are used) to impart a tensioning force to a component of the apparatus.

1. References herein to A (followed by page number) are to the Appendix attached hereto. References to R. (followed by page number) are to the transcript of the record certified to this Court by the Court of Appeals for the Tenth Circuit.

Both courts below agreed that the sole point of novelty in the patented (claimed) apparatus was the use of resilient means or springs to impart a tensioning force to a component of the claimed combination. The patent discloses and the original application claimed three alternative expedients for this purpose, namely, manually operated tensioning devices, springs, and weights. The two disclaimed alternatives, manual tensioning devices and weights, are disclosed in the prior art. In the total absence of any proof of (a) any long-felt but unsatisfied need for the claimed spring-tensioned apparatus, (b) any problems incident to the use of springs to accomplish the desired tension-imparting function in such apparatus, or (c) any function imparted to the combination not inherent in and a known function of a spring, the decisions below ignore the standards for patentable invention specifically stated in 35 U.S.C. §103 and are in conflict with the controlling decisions of this Court culminating in *Graham* v. *John Deere Co.*, 383 U.S. 1 (1966).

2. If the patent is valid, whether, under the decision of this Court in *Exhibit Supply Co.* v. *Ace Corp.*, 315 U.S. 126 (1942), the doctrine of equivalents is properly available to the patentee to support a finding of infringement of the two claims thereof by apparatus admittedly not defined thereby. This apparatus was specifically defined in original application claims which were canceled following rejection by the Patent Office on the dual ground of (a) lack of invention over prior art cited, and (b) misdescriptiveness, and the two claims of the patent were substituted in their stead.

If *Exhibit Supply Co.* v. *Ace Corp., supra,* is controlling here, the decisions below are in conflict with the applicable decision of this Court since both courts

below, by resort to the doctrine of equivalents, accorded the patent claims a construction coextensive in scope to the original canceled application claims.

If *Exhibit Supply Co.* v. *Ace Corp., supra,* is not controlling here, because of the dual grounds for rejection by the Patent Office of the original claims, the decisions below are in direct conflict with the decisions of the Courts of Appeals for the First, Sixth and Seventh Circuits[2] on an important question of patent law having substantial public interest which has not been but should be settled by this Court.

Constitutional Provision and Statutes Involved

This case involves the patent clause of the Constitution of the United States, Article I, Section 8, Clause 8 (A1), and 35 U.S.C. §§102(a) and (b) and 103 (A1).

Statement of the Case

This is an action for infringement of United States Patent No. 3,077,990 issued February 19, 1963, to J. G. Peterson for "Filter Medium Guide." The District Court's jurisdiction was properly based on 28 U.S.C. §1338(a).

Petitioner was defendant and respondents were plaintiffs in the District Court.

The District Court adjudged the two claims of the patent to be valid and infringed by petitioner, and the Court of Appeals affirmed.

---

2. See *Borg-Warner Corporation* v. *Paragon Gear Works, Inc.,* 355 F.2d 400 (1st Cir. 1965); *Powder Power Tool Corp.* v. *Powder Actuated Tool Co.,* 230 F.2d 409 (7th Cir. 1956); *Keating* v. *Stearnes Imperial Co.,* 347 F.2d 444 (7th Cir. 1965); *Parke, Davis & Co.* v. *American Cyanamid Co.,* 207 F.2d 571 (6th Cir. 1953).

Subject Matter Involved

The patent in suit relates to an apparatus to stretch, tension and maintain the alignment of a filter medium, sometimes called web or belt, used on rotary drum vacuum belt filters having a discharge section spaced from the drum. Filters of this type are sometimes referred to as belt discharge filters. For convenience, Exhibit C (R. 780), an illustrative isometric drawing of one of petitioner's belt discharge filters is included in the Appendix hereto (A53).

Belt Discharge Filters

Belt discharge filters utilize a cylindrical filter drum having closed ends but having perforations in the cylindrical or "deck" surface. The drum may vary in size. In operation, the cylindrical deck surface is covered for the greater part of its periphery by an endless filter belt. The perforated deck is connected by pipes to an automatic rotary valve. The drum is positioned with respect to a tank containing a slurry of liquids and solids so that, as the drum rotates, a portion thereof, covered by the filter belt, is immersed in the slurry. By means of the rotary valve, a vacuum is pulled on the underside of the filter drum so immersed and for a short period thereafter. The liquid phase of the slurry is thus drawn through the filter belt to the interior of the drum, and thence directed to settling tanks. The solid material (sometimes called cake) is deposited on the surface of the belt (R. 1493-1494).

As the drum rotates, the filter belt, on which the cake has been deposited, leaves the slurry and, as the drum continues its rotation, the filter belt is withdrawn from the

drum and passes over a discharge roller where an abrupt change in the direction of travel of the filter belt causes the cake to fall off the belt (R. 1494).

The filter belt then passes (a) directly to the return roll (two-roll system), or (b) over one or more wash or idler rollers, and thence to the return roll (three and five roll systems). From the return roll the belt passes directly back to the drum, where it again engages the perforated deck of the drum for a repetition of the filtering cycle (R. 1494).

Filter apparatus as described above was, admittedly, not the invention of Peterson but constitutes the environment in which the Peterson apparatus was intended to be used.

Filter Belt Alignment Problems

In normal operation of a belt discharge filter, the belt sometimes tends to track laterally to one side or the other of the drum. In such cases, if the mistracking is not corrected, the belt will mistrack onto the filter drum and some of the perforated area of the drum that should be covered by the belt when the drum is immersed in the slurry will be exposed to the slurry. When this occurs, the filtrate will be contaminated and eventually the filter will become inoperative (R. 930).

Mistracking occurs for many reasons, such as inaccuracies in the manufacture of the belt (R. 1501) or the filter drum (R. 930), misalignment of one or more of the rolls of the filter apparatus, variations in the load of filter

cake carried by the belt, or incomplete discharge of filter cake from the belt (R. 977).

Over the years, a variety of devices have been and still are used by the filter industry to correct for misalignment of the filter belt (R. 1450-1452).

The Peterson Patent

The Peterson patent in suit (Ex. 1, R. 656, A48-52) discloses and claims one type of filter belt aligning device. The claimed device is, essentially, a combination of apparatus comprising the following components: (a) the return roller of the filter apparatus (over which the filter belt passes just prior to returning to the drum and an essential component of any belt discharge filter); (b) a filter belt having beaded edges; (c) two pairs of guide wheels or rollers, one pair to coact with each of the beaded edges of the filter belt; (d) mounting means for mounting the pairs of guide wheels or rollers adjacent each end of the return roller; and (e) adjustable spring or other resilient means (as distinguished from an adjustable manually operated tensioning rod or a weight system, also disclosed in the patent) associated with each of the pairs of guide wheels or rollers to impart a tensioning force to each of the pairs of guide wheels to urge such guide wheels laterally outwardly of the path of travel of the belt so as to maintain the belt stretched and in alignment.

The Issue Concerning Obviousness

The patent specification and drawings (A48-52) disclose, and the original application claimed (Ex. 2, R. 669-672) three alternative "embodiments" of the Peterson "inven-

tion", each embodiment differing from the others only by the employment of a different mechanical expedient for inducing a tensioning force or pressure to urge each of the two pairs of guide wheels against the beaded edges of the belt and laterally outwardly of the path of travel of the belt. These expedients included (a) a system of weights (A49, Figure 5, application claim 9, R. 671); (b) a system employing a manually operated threaded tensioning rod, adjusted by a hand wheel connected to the rod (A48, Figure 2, application claim 10, Ex. 2, R. 671); and (c) a system of springs (A48-49, Figures 3, 4 and 6, application claims 3, 8 and 12, R. 669, 671, 672).[3]

The manually operable tensioning rod system in substantially the same form as shown in Figure 2 of the Peterson patent is disclosed in prior art Swiss patent (Ex. U, R. 794) where it serves to apply a tensioning force to oppositely disposed pairs of guide wheels coacting with beaded edges of a web or belt to guide and align the web or belt. The prior art Warner patent (Ex. Z, R. 794) shows a system of weights and pulleys substantially similar to those shown in the Peterson patent to apply a tensioning force to roller members in a web stretching device.

The record does not show what motivated Peterson to select springs or other resilient means—to the exclusion of the other alternative expedients disclosed in his patent and originally claimed as species of the same genus—to provide the tensioning force for his guide wheels in the claims that issued in his patent since neither the Swiss

3. Original claims 1, 2, 4 through 7 and 11 were generic to all three of the illustrated expedients for imparting a tensioning force to the guide wheels.

patent nor the Warner patent, referred to, were brought to the attention of the Patent Office (but were before the courts below).

However, because the *prior art* did not *disclose* the use of *springs,* or other *resilient* means (District Court, A26-27; Court of Appeals, A6), to apply a tensioning force to guide wheels coacting with beaded edges of a belt to tension and center the belt, both courts below held (District Court, A27-28; Court of Appeals, A8-11) that this single point of difference between the prior art and the combination *claimed* by Peterson was sufficient to justify the holding that the claimed combination satisfied the nonobvious requirements of §103.

In reaching this holding, the courts below have either confused the "novelty" requirements of §§102(a) and (b) with the "nonobvious" requirements of §103, or have ignored the mandate of this Court in *Graham* v. *John Deere Co., supra,* for determining nonobviousness of the claimed subject matter. In either case, the decisions below are in clear conflict with the decision of this Court in *Graham* v. *John Deere Co., supra.*

The Issue Concerning the Scope of the Patent Claims

Claims 1 through 10 of the claims submitted with the Peterson application as filed specified that the "guide rollers" of the claimed combination be mounted "adjacent the drum" of the filter apparatus (R. 669-671).

These ten original claims, along with original claims 11 and 12 which positioned the guide wheels as "juxta-

posed the return roller" (R. 672), were rejected in the second Patent Office Action (Ex. 2, R. 683, 684) on the grounds (1) that they were "indefinite" and "somewhat misdescriptive" and (2) were "fairly met" by cited prior art.

The applicant forthwith canceled original claims 1 through 12 and submitted in their stead application claims 18 and 19 (Patent claims 1 and 2 as issued). These substituted claims are identical in substance—apart from form—to canceled original claims 3 and 8 except that patent claims 1 and 2 specify that the guide wheels be mounted "adjacent each end of the return roller" of the filter apparatus, whereas original claims 3 and 8 positioned the guide wheels "adjacent the drum."[4] This modification of the claims was deliberately made. The remarks accompanying the amendment contained the statement:

> "Claim 18 is written along the lines of Claim 11 *pointing out more particularly that the filter medium rollers are placed adjacent a return roller* and have placed between them the filter medium with the edge bead on the outside." (Emphasis added) (R. 685-688)

At the trial, respondents' expert testified (R. 1263-1264, 1409) that "adjacent each end of the return roller" as used in the Peterson patent claims meant positioned along the edges of the belt at a point where no other element of the filter apparatus intervened between the guide wheels and the return roller.[5] While neither of the courts below

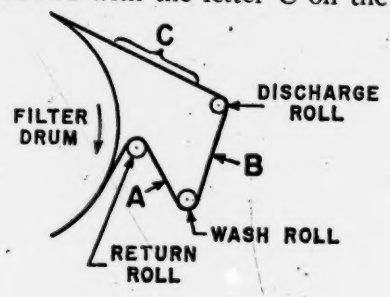
4. Application claim 3 is dependent upon and must be read with application claim 1. Application claim 8 is dependent upon and must be read with application claim 7.

5. In the courts below petitioner contended that the phrase "adjacent each end of the return roller" meant, in addition, *laterally* adjacent the ends of such roller as shown in the Peterson patent Figures 2, 3, 4, 5 and 6.

stated specifically what was meant by the limitation "adjacent each end of the return roller" in the patent claims, both adopted the testimony of respondents' expert and held that petitioner's device positioned at a point about midway between the return roller and the next preceding wash roller,[6] position A on the sketch below, was mounted "adjacent each end of the return roller" and infringed the Peterson claims literally; but that petitioner's devices mounted at positions B and C did not infringe in terms either claim since petitioner's devices, at these positions, were not mounted "adjacent each end of the return roller" because other rollers in the filter system intervened between the guide wheels and the return roller (A12, 35). Indeed, when mounted at position C, petitioner's apparatus was "adjacent the drum" (according to the definition ascribed to the word "adjacent" by respondents' expert) and hence directly within the scope of canceled original claims 3 and 8.

---

6. For convenience, petitioner has reproduced below a schematic diagram that depicts a basic three-roll belt discharge filter (based on Ex. B, R. 779) and shows (1) the relationship of the drum, discharge roller, wash roller and return roller as normally used in such filters, and (2) three different positions designated A, B and C at which petitioner's accused web guiding mechanisms have been installed. Petitioner's devices, installed at position C, have been mounted at several locations along the path of travel of the web designated generally by the bracket associated with the letter C on the sketch.



Both courts below nevertheless held that because petitioner's devices, mounted at positions A, B or C, served to align the belt, all three were equivalents and, under the doctrine of equivalents, were encompassed by and infringed the Peterson patent claims (A12-15, 35-36).

Thus, the decisions of the courts below have accorded the Peterson claims a construction that enables Peterson to recapture the precise subject matter of canceled original claims 3 and 8.

Petitioner submits that in so holding, the decisions of the courts below either (1) conflict directly with the decision of this Court in *Exhibit Supply Co., supra,* or (2) raise an important question of patent law as to the extent to which the file wrapper estoppel rule applies to claims submitted in lieu of canceled claims where the canceled claims were rejected *both* on prior art *and* for informalities in claim language, a question which has not been but should be settled by this Court.

In any event the decisions below impose limitations on the file wrapper estoppel rule that conflict directly with the applicable decisions of the Courts of Appeals for the First, Sixth and Seventh Circuits.

Reasons for Granting the Writ

1. The decision of the Court of Appeals upholds the monopoly of a patent which fails completely to meet the "nonobvious" requirement of 35 U.S.C. §103.

This Court, in *Graham* v. *John Deere Co.*, 383 U.S. 1 (1966), stated that 35 U.S.C. §103 (A1), was not intended by Congress to change the general level of patentable invention for subject matter sought to be patented and not identically disclosed in the prior art, but was intended to impose on the courts, in such instances, the directive to inquire into the obviousness of the subject matter sought to be patented as a prerequisite to patentability (383 U.S. at p. 17).

The Court then said (383 U.S. at p. 17):

> "While the ultimate question of patent validity is one of law, *A. & P. Tea Co.* v. *Supermarket Corp., supra;* at 155, the §103 condition, which is but one of three conditions, each of which must be satisfied, lends itself to several basic factual inquiries. Under §103, the scope and content of the prior art are to be determined; differences between the prior art and the claims at issue are to be ascertained; and the level of ordinary skill in the pertinent art resolved. Against this background, the obviousness or nonobviousness of the subject matter is determined. Such secondary considerations as commercial success, long felt but unsolved needs, failure of others, etc., might be utilized to give light to the circumstances surrounding the origin of the subject matter sought to be patented. As indicia of obviousness or nonobviousness, these inquiries may have relevancy."

and continued with the admonition that (383 U.S. at p. 18):

> "strict observance of the requirements laid down here will result in that uniformity and definiteness which Congress called for in the 1952 Act."

In this case, it is immaterial whether the subject matter of the claims of the Peterson patent in suit is tested against the nonobviousness requirements of §103 as set forth in *Graham* or against the judicial precedent for §103 as expressed in *A. & P. Tea Co.* v. *Supermarket Corp.*, 340 U.S. 147 (1950); *Altoona Theatres* v. *American Tri-Ergon Corp.*, 294 U.S. 477, 486 (1935); *Sinclair Co.* v. *Interchemical Corp.*, 325 U.S. 327 (1945), and *Lincoln Co.* v. *Stewart-Warner Corp.*, 303 U.S. 545 (1938), among others.

In either case, the combination of the Peterson claims fails completely to satisfy the tests steadfastly adhered to by this Court since *Hotchkiss* v. *Greenwood*, 11 How. 248 (1850) as justification of a private grant on the public domain.

The web aligning and tensioning apparatus of the Peterson claims, at best, required a very low order of skill for a mechanic working in the filter field. See, for example, the unequivocal statement of patentee Peterson (R. 964, 965) that "* * * at the time of this concept I wasn't intelligent enough to know that the cloth had to slide at that time on the return roller * * *"—as the belt passed over the return roller when the guide wheels were positioned at the end of the return roller as in Figure 2 (A48) of the patent.

The prior art Clark patent (Ex. K, R. 786) disclosed a belt discharge filter, including a drum, discharge roller,

wash roller and return roller which employed a filter belt with beaded edges. The use of guide wheels coacting with the beaded edges of a belt and one of the three expedients disclosed by Peterson for imparting a tensioning force to such guide wheels (the tensioning rod system) to cause them to coact with the beaded edges of the belt to tension and center the belt are shown in the Swiss patent (Ex. U, R. 794). The Warner patent disclosed another of Peterson's expedients for imparting tension to the guide wheels (weights and pulleys) in a slightly different environment (Ex. Z, R. 794).

Thus, as each of the courts below held (A6, 26-27), the only feature of the apparatus claimed in the Peterson patent claims not shown in the prior art discussed above is the use of springs or other resilient means to impart the tensioning force to the guide wheels—and that feature is shown in the patent as an alternative expedient to the prior art tensioning rod and weight systems which Peterson originally claimed as species of his inventive concept.

In the circumstances, the comments of the Court in *Technograph Printed Circuits Ltd.* v. *Bendix Aviation Corp.*, 218 F.Supp. 1 (Md. 1963), affirmed, per curiam, 327 F.2d 497 (4th Cir. 1964), seem particularly apt. There it was said of the Eisler patent in suit in that case (218 F.Supp. at p. 24):

> "The case * * * is that of one who thought his invention was a pioneering one, and who therefore initially claimed more than he himself later realized could be claimed; and who therefore disclosed in his specifications a number of equivalents. Many if not all of these

were clearly within the prior art. If in fact they, or any one of them, is within the prior art, and they are equivalents, there is no invention in the substitution of one for any other."

In the present case there can be no valid contention that the substitution of springs for weights or springs for manually operated tensioning rods involved invention.

All three of these mechanical expedients were shown as permissible alternatives and within the concept of the invention for which Peterson originally filed application for patent (Ex. 2, R. 657).

No function other than that inherent in the spring is served by the spring means claimed. Weights and springs have been judicially recognized as mechanical equivalents in a machine since at least as early as 1879 (*Imhaeuser* v. *Buerk,* 101 U.S. 647, 656 (1879)). Indeed, as was said in *Kenney Mfg. Co.* v. *J. L. Mott Iron Works,* 137 F. 431, 433 (S.D.N.Y. 1905), "the interchangeable use of weights and springs is the stock illustration for equivalents." The use of tensioning rods is but another equally available and well known mechanical expedient and was recognized as such by Peterson in his patent (A48-52). Each of these expedients is endowed with its own inherent advantages and disadvantages; and all were equally well known in the mechanical arts long before Peterson entered the field. The selection of one in the place of another was wholly dependent on the extent to which the inherent functioning of the expedient selected met the requirements of the mechanic.

There is no suggestion in the record of this case of any problems incident to the adoption or use of springs in the Peterson combination. Indeed, the Peterson patent clearly indicates the absence of such problems.

Nor is there any indication that Peterson's use of springs in his claimed combination served to make available an apparatus that satisfied any long-felt but unsolved problem. On the contrary, the record shows by wholly uncontroverted testimony that (notwithstanding the complete lack of any use by *either* respondent of *any* device such as disclosed by the Peterson patent, A28-29) when a desire was voiced for spring-biased guide wheel mechanisms to align filter belts, such device was immediately forthcoming, produced by petitioner's engineers prior to the issuance of the Peterson patent and without benefit of the disclosures of that patent (R. 1454-1462).

In the circumstances, Peterson's *selection* of spring means for his claimed combination in lieu of the manually operated tensioning rod or weight disclosed in the prior art and shown as alternatives in his patent certainly was no less obvious than was:

(1) Graham's inverting and modifying the coupling of a chisel plow shank with respect to the hinge plate to effect free flexing of the shank, which this Court held did not meet the nonobvious requirements of §103 in *Graham* v. *John Deere Co., supra.*

(2) Gessler's selection of known ingredients (each endowed with its own inherent characteristics) to compound a quick drying ink which this Court held to be

unpatentable in *Sinclair Co.* v. *Interchemical Corp.*, 325 U.S. 327 (1945).

(3) Vogt's selection of a flywheel to assure accuracy and precision of film movement in apparatus for recording and reproducing talking pictures, which the Court held to fall short of patentable invention in *Altoona Theatres* v. *American Tri-Ergon Corp.*, 294 U.S. 477 (1935).

(4) Turnham's cashier's counter and movable frame, held to be unpatentable in *A. & P. Tea Co.* v. *Supermarket Corp.*, 340 U.S. 147 (1950); or

(5) Butler's utilization of an improved coupler in an old combination of elements comprising a lubricating apparatus, which this Court held to be an aggregation of known elements, each serving its intended function and, hence, failing to reach the dignity of a patentable invention, in *Lincoln Co.* v. *Stewart-Warner Corp.*, 303 U.S. 545 (1938).

In each of the last two cited cases (*A. & P. Tea Co., supra,* and *Lincoln Co., supra*), as here, the District Court had found the patent in suit valid and its judgment was affirmed by the Court of Appeals. This Court, in each instance, considered carefully the "combinations" of the patents there in suit and concluded that they failed to meet this Court's requirements for patentable invention. The Court said, in *A. & P. Tea Co.* (340 U.S. at pp. 152, 153-154):

> "Courts should scrutinize combination patent claims with a care proportioned to the difficulty and

> improbability of finding invention in an assembly of old elements. The function of a patent is to add to the sum of useful knowledge. Patents cannot be sustained when, on the contrary, their effect is to subtract from former resources freely available to skilled artisans. A patent for a combination which only unites old elements with no change in their respective functions, such as is presented here, obviously withdraws what already is known into the field of its monopoly and diminishes the resources available to skillful men. This patentee has added nothing to the total stock of knowledge, but has merely brought together segments of prior art and claims them in congregation as a monopoly.
>
> * * *
>
> "The questions of general importance considered here are not contingent upon resolving conflicting testimony, for the facts are little in dispute. We set aside no finding of fact as to invention, for none has been made except as to the extension of the counter, which cannot stand as a matter of law. The defect that we find in this judgment is that a standard of invention appears to have been used that is less exacting than that required where a combination is made up entirely of old components."

In the present case, neither Peterson nor either of the courts below has suggested that Peterson invented the spring or any particular apparatus for adapting a spring to the other elements of his claimed combination, all of which were *per se* old. In the Peterson claimed combination, the spring is used for the same purpose for which all springs are used in machines, to impart a tensioning force or pressure to a component of the apparatus, and neither Peterson nor either of the courts be-

low has suggested any change in the respective functions of any of the components of the claimed combination. The Peterson patent adds nothing to the sum of useful knowledge. By holding such a patent valid, the decisions of the courts below serve only to diminish the resources available to skillful men.

The decisions below are in conflict with the controlling decisions of this Court. The petition should be granted to allow this Court to make it unequivocally clear that the "nonobviousness" requirements of 35 U.S.C. §103, are not to be confused with the "novelty" requirements of §§102 (a) and (b), and as construed in *Graham* v. *John Deere Co.*, 383 U.S. 1 (1966), the §103 requirements are to be meticulously followed by the Federal Courts.

2. The decision of the Court of Appeals accords to the Peterson patent claims a range of equivalents foreclosed to them by file wrapper estoppel.

Both the Court of Appeals and the District Court (A 14-15, 35-36) held that the Peterson patent claims were entitled to a range of equivalents sufficiently broad to encompass within their scope the substance of original canceled claims 3 and 8 (when those claims are read respectively with original claims 1 and 7 on which they are dependent, R. 669-671).

These claims, original claims 3 and 8, were among those rejected by the Patent Office by the second Office Action dated October 25, 1961 (R. 683, 684), in which the Examiner stated:

> "Claims 1-12 are rejected as indefinite and somewhat misdescriptive * * *.

"Claims 1-12 are further rejected as unpatentable over Alston [U.S. Patent No. 2,880,875, Ex. R, R. 794] in view of the British patent [British Patent No. 812,197, Ex. P, R. 788] or vice versa * * *.

"Applicant's argument has been carefully considered but the claims are fairly met by the newly applied references as above." (Bracketed matter added)

Claims 1 through 12 were thereupon canceled and application claims 18 and 19 (Patent claims 1 and 2) substituted in their place.

Apart from form, patent claims 1 and 2 differ from canceled original claims 3 and 8 only in that in the canceled claims the guide wheels were required to be mounted "adjacent the drum" whereas the patent claims call for the guide wheels to be mounted "adjacent each end of the return roller."

Petitioner's devices mounted at position C (sketch *supra,* footnote 6, p. 11) are not "adjacent each end of the return roller" and do not infringe in terms either patent claim (A12, 35) but are between the drum and the discharge roller, that is "adjacent the drum" by the definition urged by respondents in construing the word "adjacent" as it is used in the Peterson claims (R. 1263-1264) and, hence, within the scope of the substance of canceled original claims 3 and 8.

In the circumstances, if the decision of this Court in *Exhibit Supply Co., supra,* is controlling here, Peterson's patent claims are clearly foreclosed from a construction that would encompass within their scope petitioner's de-

vices mounted at position C, and the decision below holding petitioner's device so positioned to be an infringement of Peterson's claims are in direct conflict with *Exhibit Supply Co., supra.* In that case, this Court said (315 U.S. at pp. 136-137):

> "Whatever may be the appropriate scope and application of the doctrine of equivalents, where a claim is allowed without a restrictive amendment, it has long been settled that recourse may not be had to that doctrine to recapture claims which the patentee has surrendered by amendment.
>
> * * *
>
> "* * * As the question is one of construction of the claim, it is immaterial whether the examiner was right or wrong in rejecting the claim as filed."

Both courts below avoided the restraints imposed by this Court in *Exhibit Supply Co., supra,* with respect to the scope and application of the doctrine of equivalents to the Peterson patent claims by concluding (a) that, notwithstanding the explicit language used by the Examiner in rejecting original application claims 1 through 12 (see *supra* p. 20), he did not intend to reject them on prior art (A16-17, 33-34); and (b) the applicant did not intend, by the limitation "adjacent each end of the return roller," to distinguish from the cited art (A16-17, 33-34). At least in part, the courts' conclusions on this issue were based on the speculative opinion testimony of respondents' expert (R. 1259-1262) as to what was in the Examiner's mind when he rejected original application claims 1 through 12 and in the applicant's mind when he substituted the patented claims for the canceled original claims (A16-17, 33-34).

Petitioner submits that these holdings are directly in conflict not only with the letter but also with the very purpose and intent of this Court's decision in *Exhibit Supply Co., supra.* Whether or not there was merit in the Examiner's rejection of these claims on the prior art—indeed, whether or not, in retrospect, the Examiner was right or wrong in his rejection—is immaterial. By the same token, it is immaterial whether the limitations inserted in the allowed claims were necessary to avoid the prior art. In either event, recourse to the doctrine of equivalents to recapture the subject matter of the surrendered claims is proscribed by *Exhibit Supply Co., supra.*

Petitioner submits further that if *Exhibit Supply Co., supra,* is deemed not to be controlling in this case because the patent claims in suit here were submitted by amendment to avoid rejection of the canceled original claims on the dual grounds of "misdescriptiveness" and as "fairly met" by the cited art, the decisions below raise a question which *per se* has not been but should be decided by this Court.

Moreover, the decisions below are directly in conflict with the decisions of the Courts of Appeals for the Seventh and Sixth Circuits in *Powder Power Tool Corp.* v. *Powder Actuated Tool Co.*, 230 F.2d 409 (7th Cir. 1956); *Keating* v. *Stearnes Imperial Co.*, 347 F.2d 444 (7th Cir. 1965); and *Parke, Davis & Co.* v. *American Cyanamid Co.*, 207 F.2d 571 (6th Cir. 1953), to the extent that they limit application of the file wrapper estoppel rule to changes in an application claim "made to overcome rejections by the Patent Office for the reason that the claim was anticipated in prior art similarities" * * * and exclude its application

to changes made in claims "where the patentee encountered difficulties in the Patent Office because of particular wording and indefiniteness of the claims" (A15, 43-44). They are also in conflict with the dictum of the Court of Appeals for the First Circuit in *Borg-Warner Corporation* v. *Paragon Gear Works, Inc.*, 355 F.2d 400 (1st Cir. 1965). There the court made reference to the divergent views as to the application of the file wrapper estoppel rule in the Tenth Circuit as evidenced by the decision in *McCullough Tool Company* v. *Well Surveys, Inc.*, 343 F.2d 381 (10th Cir. 1965), and the Seventh and Sixth Circuits as evidenced, respectively, by the decisions in *Powder Power Tool Corp., supra,* and *Parke, Davis & Co., supra,* but said that in its view the conflict was largely linguistic. However, the court's statement in *Borg-Warner Corporation, supra* (355 F.2d at p. 406) that

> "If an applicant who accedes to a demand based on the prior art is thereafter estopped to contest its necessity, he should equally be estopped to deny the correctness of a demand for which some other reason is given. To a party examining the file to determine the true scope of what has been granted, and finding something affirmatively disclaimed, it should make no difference what was the purpose of the disclaimer.
>
> "In our opinion the determinative factor should be not the reason why a change was required by the Patent Office, but what, in fact, was surrendered."

was clearly intended to express the rule to be followed in the First Circuit. The rule thus expressed appears to be implicit from the decision in *Exhibit Suppy Co., supra.* It conflicts in substance, and not in linguistics, from that adopted in this case by the Court of Appeals for the Tenth Circuit.

The file wrapper estoppel rule as expressed by the courts below can only lead to speculation and indefiniteness in claim interpretation, place a premium on artful misdescriptiveness in initial claim drafting as a means to avoid file wrapper estoppel, and promote the questionable practice of forum shopping in cases involving this issue.

The question thus presented is an important one. It involves a substantial public interest not only to patent owners but to industry in general. It is a serious question which should be definitively determined by this Court.

Conclusion

On the record in this case, the writ of certiorari should be issued to the Court of Appeals for the Tenth Circuit to the end that the questions here presented may be reviewed and determined by this Court in the interests of the orderly administration of justice.

Respectfully submitted,

GRANVILLE M. BRUMBAUGH
MARK N. DONOHUE
Attorneys for Petitioner

Of Counsel:
BRUMBAUGH, GRAVES, DONOHUE & RAYMOND

APPENDIX

Constitutional Provision and Statutes Involved

Constitution

ARTICLE 1

Section 8. The Congress shall have the Power * * *

To promote the Progress of Science and useful Arts, by securing for limited Times to Authors and Inventors the exclusive Right to their respective Writings and Discoveries; * * *.

Statutes

35 UNITED STATES CODE

§102. Conditions for patentability; novelty and loss of right to patent

A person shall be entitled to a patent unless—

(a) the invention was known or used by others in this country, or patented or described in a printed publication in this or a foreign country, before the invention thereof by the applicant for patent, or

(b) the invention was patented or described in a printed publication in this or a foreign country or in public use or on sale in this country, more than one year prior to the date of the application for patent in the United States, * * *.

§103. Conditions for patentability; non-obvious subject matter

A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negatived by the manner in which

Opinion of United States Court of Appeals

UNITED STATES COURT OF APPEALS

TENTH CIRCUIT

DECEMBER TERM—1968

No. 9806

THE EIMCO CORPORATION,

Appellant,

v.

PETERSON FILTERS AND ENGINEERING COMPANY and KOMLINE-SANDERSON ENGINEERING CORPORATION,

Appellees.

APPEAL FROM THE UNITED STATES DISTRICT COURT FOR THE DISTRICT OF UTAH, CENTRAL DIVISION
(No. 33-66 Civil)

Before:

PICKETT, LEWIS and HICKEY, Circuit Judges

Opinion of the United States Court of Appeals

PICKETT, Circuit Judge

This is a patent infringement suit in which the appellees, Peterson Filters and Engineering Company and Komline-Sanderson Engineering Corporation, allege infringement of Patent No. 3077990 and seek damages, together with injunctive relief prohibiting further infringement.[1] The objects of the patent are to overcome tracking and wrinkling problems encountered in the operation of a rotating endless filter belt. The trial court rejected a defense of invalidity and held the patent valid and infringed.

The patent discloses a device for the alignment of filter belts on an apparatus which is used in the sanitation and industrial fields to separate liquid from solids. In operation the filter belt is a part of a rotary drum filter machine, the drum being positioned in a tank containing the fluid to be separated and referred to in this litigation as "slurry". The drum is cylindrical in shape, with closed ends and a perforated surface. Spaced from the drum surface is a cleaning section consisting of a discharge roller and other rollers the number of which varies depending upon the type of machine used. The endless filter belt is looped over the drum and the discharge section assembly. Necessarily the belt is substantially longer than the circumference of the drum. For efficient operation all of the perforated portion of the drum, which is immersed in the slurry, must be completely covered by

1. The patent was issued to John G. Peterson on February 19, 1963, and later assigned to Peterson Filters and Engineering Company. Komline-Sanderson Engineering Corporation is an exclusive licensee under the patent, restricted to the field of sanitation and has a restricted right to sue for infringement.

the filter belt to prevent the entry of the raw slurry into the drum and thence into the pipes and valves, thereby causing the filter mechanism to become inoperative. By means of a rotary valve, a vacuum is created on the under side of the filter belt and the liquid phase of the slurry is drawn through the filter to the interior of the drum and the solids remain on the surface. As the drum rotates, the belt leaves the surface of the drum and passes over the rollers of the discharge system. At the first roller there is an abrupt change in the course of the belt which causes the solids to fall off. Thereafter the belt continues over additional rollers for cleaning and positioning for return to the drum surface and commencement of another filter cycle. Due to various causes, the filter belts when passing over the rollers have had a tendency to creep either to the right or left, preventing return of the belt to the drum head in a manner which would cover all of the perforated surface thereof. Such misalignment of the belt also causes a wrinkling which tends to prevent a satisfactory operation. The vacuum drum filter belt process was well known in the art at the time of the issuance of the Peterson patent, but the new element claimed in this combination was a filter belt guide which continuously and automatically realigns the belt before it returns to the drum surface.[2]

2. The patent states that it is "an important object of the invention to provide a novel filter medium and mechanism for maintaining an endless filter medium centered on a rotary drum and through a discharge section spaced from the drum surface. The invention provides centering of the medium, eliminates wrinkling of the material of the filtering medium either on the drum or in the discharge section, and provides positive tracking for the medium onto the drum without training rods. The mechanism of the invention laterally stretches the filter medium, retarding blinding of its openings and provides for more complete cleaning of the filter medium prior to its return to the filter drum for additional filtering action."

The realignment device disclosed in the Peterson patent consists of two pairs of guide rollers or wheels with springs attached, mounted one adjacent each end of the last roller before the belt returns to the drum. These wheels bear against the beaded edges on the outer sides of the belt and force it laterally outward, away from the center. The tension creating the force of the guide rollers when engaging the beading is provided by adjustable attached springs. The assembled tensioning and guiding device includes means for adjusting the amount of lateral tension to be applied.[3] If the realignment device is mounted at the ends of a roller, sufficient force must be applied against the beading to cause the belt to slide

3. The patent claims are as follows:

1. In a filter medium tracking and tensioning device for a rotary drum filter having a separate cake discharge section, an endless filter medium looped over the filter drum and extending through the cake discharge section, which filter medium includes a bead on each edge of the filter medium extending completely therearound, and a filter medium return roller mounted adjacent the filter drum, the improvement which comprises means for tracking the filter medium back to said drum inclusive of a pair of rollers mounted adjacent each end of the return roller, each pair of rollers being mounted in substantial contacting relation and mounted with the filter medium therebetween and in position to bear against the bead at the edge thereof, each said pairs of rollers being arranged to move laterally in respect to the path of travel of the filter medium, resilient means attached to said rollers in position so that the rollers bear against the bead at each side of the filter medium to stretch the filter medium therebetween and to center it in relation to the return roller and the filter drum, and means for supporting each pair of said rollers in position on said filter medium and biased against the adjacent bead at the edge thereof.

2. A device according to claim 1 in which each said pair of bead contacting rollers is spring biased laterally away from the filter medium so as to provide essentially uniform tensioning on the filter medium. (Claims 1 and 2 from patent.)

across the roller in order to effect a realignment. The ultimate object of the Peterson device is to guide the filter belt in a smooth condition back to the drum for the purpose of covering all of the surface exposed to the vacuum.

The trial court found that this element with the resilient means or springs attached to the guide rollers in position so that the rollers bear against the beads of the filter belt to tension and center the belt, as claimed in the Peterson patent, was not found in any of the prior art patents cited by the patent office during the prosecution of the Peterson application nor in any additional prior art cited by Eimco. Eimco does not question this finding.

The Eimco filter belt aligning mechanism is similar to that described in the Peterson patent. In operation the mechanism is mounted on both sides of the belt at a position between the rollers in the discharge section of the filter machine, or between the drum and the first roller, but not on the end of any roller. In some instances the guide wheels bear against the beaded edge of the belt only on the side that is in need of adjustment, but the contact relation between these two elements is substantially the same as that of the Peterson device. Eimco urges that the function of its device differs from that of Peterson in that its location between the rollers utilizes the principle of "planar action" in its operation, while the function of the Peterson patent is to cause a slippage or sliding of the belt across one of the rollers to obtain realignment. The spring tension necessary to obtain realignment when the device is positioned between the rollers is much less than when it is mounted on one of the rollers. It is not

contended that the belt realignment result obtained is different in either instance.

The principal issues presented by Eimco are that the trial court erred in not holding the Peterson patent invalid, for failure to meet the tests of non-obviousness required by 35 U.S.C. 103, non-infringement, and a file wrapper estoppel.

A patent is presumed to be valid and this presumption can be overcome only by clear and convincing evidence. *Griswold* v. *Oil Capital Valve Co.*, 10 Cir., 375 F. 2d 532; *King-Seeley Thermos Co.* v. *Refrigerated Dispensers, Inc.*, 10 Cir., 354 F. 2d 533. Likewise, one asserting invalidity of a patent on the ground of anticipation has the same burden of proof. *Griswold* v. *Oil Capital Valve Co., supra; McCullough Tool Co.* v. *Well Surveys, Inc.*, 10 Cir., 343 F. 2d 381, *cert. denied*, 383 U. S. 933; *Mott Corp.* v. *Sunflower Industries, Inc.*, 10 Cir., 314 F. 2d 872.

Generally, when elements old in the art are combined together in a manner which secures a new and useful result or an old result in a more facile, economical and efficient manner, there is a patentable combination. *McCullough Tool Co.* v. *Well Surveys, Inc., supra; Oliver United Filters, Inc.* v. *Silver*, 10 Cir., 206 F. 2d 658, *cert. denied*, 346 U. S. 943.

Utility, novelty, and non-obviousness are separate tests of patentability and all must be satisfied for a valid patent. *United States* v. *Adams*, 383 U. S. 39.

The utility of the Peterson combination is not questioned, and Eimco recognizes that the use of the spring tension device to urge the guide wheels outwardly to align

the filter belt as it progresses in the filtering cycle was not in the prior art. It contends, however, that the validity of the patent cannot be upheld on any single essential element, but that patentability must be determined on whether the combination as a whole would have been obvious to a worker having ordinary skill in the art at the time the alleged invention was made. This is a statutory law, and the law of this Circuit. 35 U.S.C. 103;[4] see *Graham* v. *John Deere Co.*, 383 U.S. 1;[5] *Mott Corp.* v. *Sunflower Industries, Inc. supra.* The trial court found that the prior art called to its attention, and the testimony of Eimco's expert witness to the effect that the substitution of a resilient means for a non-resilient means of tracking a filter belt was within the skill of the worker in the art, "did not overcome the indications in the record to the contrary and the presumption of the validity attaching to the patent."

Eimco's objection to this finding as we understand it, is that the trial court, in determining the "non-obvious" requirement, limited its inquiry to Eimco's failure to

4. 35 U.S.C. 103 provides: "A patent may not be obtained though the invention is not identically disclosed or described as set forth in Section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negatived by the manner in which the invention was made."

5. 383 U.S. 19. With reference to the purpose of Sec. 103 the Supreme Court said: "Although we conclude here that the inquiry which the Patent Office and the courts must make as to the patentability must be beamed with the greater intensity on the requirements of Sec. 103, it bears repeating that we find no change in the general strictness with which the overall test is to be applied."

establish the lack of novelty required by Section 102. It is urged that utility or novelty are not necessary criteria in the determination of the Section 103 requirements. Obviousness is not to be determined by the lack of utility or novelty, but one of the factual tests contemplated by Section 103 is a comparison between the subject matter sought to be patented and the prior art in reaching a conclusion as to obviousness or non-obviousness under the statutory standards. In the *Graham* case the court said:

> "We believe that this legislative history, as well as other sources, shows that the revision was not intended by Congress to change the general level of patentable invention. We conclude that the section was intended merely as a codification of judicial precedents embracing the Hotchkiss condition, with congressional directions that inquiries into the obviousness of the subject matter sought to be patented are a prerequisite to patentability.
>
> "Approached in this light, the Section 103 additional condition, when followed realistically, will permit a more practical test of patentability. The emphasis on non-obviousness is one of inquiry, not quality, and, as such, comports with the constitutional strictures.
>
> "While the ultimate question of patent validity is one of law, A. & P. Tea Co. v. Supermarket Corp., supra, at 155 (340 U.S. 147), the Section 103 condition which is but one of three conditions, each of which must be satisfied, lends itself to several basic factual inquiries. Under Section 103, the scope and content of the prior art are to be determined; differences between the prior art and the claims at issue are to be ascertained; and the level of ordinary skill

in the pertinent art resolved. Against this background, the obviousness or non-obviousness of the subject matter is determined." See also Carson v. Bland, 10 Cir., 398 F. 2d 423.

In determining the Section 103 issue the trial court made the inquiry as to the obviousness or non-obviousness of the subject matter as suggested by the Supreme Court. The determination of non-obviousness was not limited to a finding of lack of novelty. This is illustrated by a reference in its finding to the testimony of Eimco's expert witness and indications in the record to the contrary.

The trial court's complete and careful findings disclose that for the purpose of ascertaining whether the Peterson device would be obvious to a person having ordinary skill in the art, it measured the device with the prior art together with the record as a whole. As indicated in the *Graham* case, obviousness "to a person having ordinary skill in the art" is an illusive factual subject to be determined by the trial court. In recognizing the difficulties of Section 103 problems, the court warned that "what is obvious is not a question upon which there is likely to be uniformity of thought in every given context. The difficulties, however, are comparable to those encountered daily by the courts in such frames of reference as negligence and s[illegible]nter, and should be amenable to a case by case development." The difficulties referred to are questions of fact to be determined in the trial court. The courts agree that the ultimate question of validity is one of law, *Griswold* v. *Oil Capital Valve Co., supra,* but obviousness as referred to in Section 103 is a question of

fact for the trial court, which determination should not be set aside in the absence of clear error. *Graver Mfg. Co.* v. *Linde Air Products Co.*, 336 U. S. 271; *McCullough Tool Co.* v. *Well Surveys, Inc., supra; Maytag Co.* v. *Murray Corp. of America*, 6 Cir., 318 F. 2d 79. In *Admiral Corp.* v. *Zenith Radio Corp.*, 296 F. 2d 708, we said: "On conflicting evidence the trial court held that the devices covered by the Zenith patents would not have been obvious to one of ordinary skill in the art. This is a finding of fact which cannot be set aside as clearly erroneous." The finding of non-obviousness is amply supported by substantial evidence, and we agree with the trial court that the presumption of validity has not been overcome. We find no language in *Graham* v. *John Deere Co., supra,* that requires a different approach to the non-obvious question than that made by the trial court, or that is contrary to our former decisions.

On the question of infringement, Eimco insists that its belt centering device is not within the teaching of the Peterson patent. It argues that the claims of the patent and the specifications restrict the mounting of the belt aligning device to the ends of the return roller; therefore, its mechanism, which in operation is mounted only between rollers at various unsupported expanses of the belt, is not an infringement. The Eimco device is in all respects similar to that claimed in the patent, including guide rollers with springs attached to them. In operation, the Eimco mechanism is located at places other than at the end of a roller, and the direction of the belt is changed by pressure of the guide wheels against the

beaded edges before it reaches the roller.[6] But as the belt approaches the rotating drum its alignment is the same as that resulting from the action of the Peterson device.

The trial court, after a consideration of all the evidence, observing a demonstration of a model designed from the Peterson model, and viewing the Eimco apparatus in actual operation, found:

> "While defendant's apparatus with guide rollers at locations other than that between the return roll and the preceding idler roll do not meet the literal terms of the claims, in that they were not mounted adjacent the ends of the return roller, the guide rollers at other locations in the path of travel of the belt perform substantially the same function as guide rollers mounted between the return roll and the idler roll. That function is to correct mistracking of the filter belt to track the belt back to the filter drum and center it with respect thereto, and to stretch the belt beween opposed pairs of guide rollers.
>
> "In all positions between rolls or the drum and in the path of travel of the belt, the guide rollers per-

6. The trial court in its findings described the Eimco mechanism in operation as follows: "The Eimco Edgetrack aligning devices have been located on its filters in every instance in a position at an otherwise unsupported span of the filter web. In no instance has Eimco's aligning device been mounted laterally adjacent the end of the return roll or any other roll. In most instances on the defendant's three-roll system, defendant's aligning device is located between the filter drum and the discharge roller. In a few instances, the defendant's aligning device has been located between the return roller and the next preceding roller in its three-roll system. In all instances in defendant's two-roll system, defendant's aligning device has been located between the filter drum and the discharge roller. In all instances in defendant's five-roll system, defendant's aligning device has been located between the filter drum and the discharge roller Defendant's guide rollers do not contact the filter belt when the belt is in contact with a roll, such as the discharge roll or return roll.

form their function in substantially the same way as guide rollers mounted between the return roll and idler roll. The mode of operation is the same, i.e., to laterally displace the filter belt to one side so that the belt will track by planar motion on to the following roll in the path of travel of the belt. When the guide rollers contact the filter belt while the belt is in contact with the return roll or any roll other than the filter drum, the rollers still act to move the belt laterally by slippage and the belt then tracks by planar motion on the next roll in its path of movement. Since the primary object of the invention and the accused device is the centering of the stretched filter medium on the drum, the court regards the precise location of the guide rollers with reference to the rollers as incidental; and particularly with reference to the centering of the filter medium on the filter drum the devices operate in substantially the same way and perform substantially the same function to accomplish substantially the same result. Moreover, it is found that any difference in location of the guide rollers between the patented device and the accused device would be an equivalent variation which would be obvious to one possessing ordinary skill in the art."

The court also found that there was no teaching in the patent disclosure "that the return roll must be in contact with the belt at the same time that the guide rollers exert tension across the belt" for a proper functioning of the patented device.

The law of infringement applicable to this case was stated by this court in *King-Seeley Thermos Co.* v. *Refrigerated Dispensers, Inc., supra,* as follows:

"Infringement is not avoided by making a machine which differs in form but appropriates the principle and mode of operation of the patented machine by the use of the same or equivalent means. Janco, Inc. v. Carlson, supra; Jones v. Bodaness, 10 Cir., 189 F. 2d 838; Stearns-Roger Mfg. Co. v. Ruth, 10 Cir., 62 F. 2d 442; Johns-Manville Corp. v. National Tank Seal Co., 10 Cir., 49 F. 2d 142. Infringement exists if the accused device performs substantially the same function in substantially the same way and accomplishes substantially the same result as the patented device, even though they differ in name, form and shape. Graver Tank & Mfg. Co. v. Linde Air Products Co., 339 U. S. 605, 70 S. Ct. 854, 94 L. Ed. 1097, reh. denied 340 U. S. 845, 71 S. Ct. 12, 95 L. Ed. 620. If the accused machine falls clearly and definitely within the claim of a patent, infringement is made out. McCullough Tool Co. v. Well Survey, Inc., supra. The protection of the provisions of a patent cannot be avoided by adding materials unless a wholly different result is obtained. 'Colorable differences without substance do not avoid infringement.' Bewal, Inc. v. Minnesota Mining and Mfg. Co., supra, 292 F. 2d at 167. Cf. Reiner v. I. Leon Co., 2 Cir., 285 F. 2d 501, cert. denied 366 U. S. 929, 81 S. Ct. 1649, 6 L. Ed. 2d 388, reh. denied 366 U. S. 978, 81 S. Ct. 1918, 6 L. Ed. 2d 1268."

The evidence is without substantial conflict that the place of applying force to the edges of the filter belt and the alignment resulting from the use of the Eimco equipment is the same as that of the patented machine regardless of where it is placed on the structure over which the belt passes. We agree with the trial court that the placing

of the equipment between rollers or between the drum and the discharge roller is inconsequential and is merely a substitution of equivalents. The Eimco machine wherever it is placed on the belt uses the same principle and mode of operation as the one described in the Peterson patent. The two devices do the same work in substantially the same way and produce substantially the same result. This is the test of infringement, as indicated in *King-Seeley Thermos Co.* v. *Refrigerated Dispensers, Inc., supra,* and the cases cited therein.

Finally, Eimco contends that the "file wrapper" history of the Peterson patent discloses that to obtain his patent, Peterson explicitly limited the mounting of his belt realignment device to a particular point "adjacent to each end of the return roller" and cannot now expand that language to encompass alignment apparatus positioned between rollers such as that used by Eimco. The law is settled that the extent of an invention is to be determined by the patent claims, together with the "file wrapper" history in the Patent Office, and a claim which has been narrowed for the purpose of obtaining the patent cannot be expanded to include that which was eliminated. *Graham* v. *John Deere Co., supra.* The application of this doctrine, however, is limited to changes made to overcome rejections by the Patent Office for the reason that the claim was anticipated in prior art similarities. It is not applicable where the patentee encountered difficulties in the Patent Office because of particular wording and indefiniteness of the claims. *McCullough Tool Co.* v. *Well Surveys, Inc., supra; Sears Roebuck & Co.* v. *Jones,* 10 Cir., 308 F. 2d 705.

When the Peterson application was filed it contained seventeen claims. The first thirteen were directed to a belt aligning mechanism as illustrated in the Peterson patent. The original claims 1 to 10 specified that the mechanism was to be mounted or positioned adjacent to the filter drum. Original claims 11 and 12 provided for two single "bead contacting rollers" which were "juxtaposed to the ends of the return roller and arranged to move laterally opposite one another to guide and stretch the web in cooperation with the return roller". All of the original claims were rejected by the Patent Office for the reason that they were indefinite and directed to an old combination. Peterson then canceled claim 13 and amended claims 1 to 12. These claims were again rejected for indefiniteness and as unpatentable over the prior art. In response to this rejection, Peterson canceled all of his claims and substituted in their place claims 18 and 19, which are now claims 1 and 2. It is argued that to overcome the rejections of the aforesaid claims, Peterson provided that his roller system for aligning the filter belts would be "mounted adjacent each end of the return roller". It is said that to permit the positioning of the Peterson device in any other location, particularly between rollers, would allow him to recover and include in his patent that which he excluded to obtain it.

An expert witness, after analyzing the Patent Office records, testified that the term "adjacent each end of the return roller" was inserted in the claims for clarifying language and not for the purpose of overcoming a Patent Office objection on the prior art. The witness also said

that when Peterson used the term he could have instead appropriately and reasonably said "by means of rollers mounted adjacent to the outer edge of the filter medium".

The trial court found that the critical phrase was included in the patent to overcome a Patent Office rejection because the language of the claims was indefinite and misdescriptive, and not to avoid a rejection on the prior art.[7] The record sustains these findings.

AFFIRMED.

---

7. The trial court's findings on the question of "file wrapper" estoppel included the following:

> "From the testimony of Burns, plaintiffs' expert, and an examination of the file wrapper of the Peterson patent, I find that the Examiner meant by this rejection that the guide rollers could not be in line with the center of the filter drum because in the drawings and the specification the guide rollers were disclosed as near the outer edges of the drum and that such a position is necessary in order for the guide rollers to contact the beads on the outer edges of the belt. In Paper No. 5 the Examiner said that the rollers were shown "adjacent" the outer edges of the drum. The applicant responded to this rejection by locating the rollers adjacent the ends of the return roll, which, with respect to the filter belt is the same location as the outer edges of the drum.
>
> "In Paper No. 5 the Examiner also rejected claims 1 to 12 as unpatentable over U. S. Patent No. 2,880,875 to Alston in view of British Patent No. 812,197 or vice versa, and claims 14 to 16 as fully met by the British patent. The phrase "adjacent each end of the return roller" was not placed in claim 18 (claim 1 of the patent) to meet this basis of rejection on the prior art. There is no indication that in this rejection on the prior art the Examiner required claim language that the guide rollers be mounted laterally adjacent the ends of the return roller as contrasted with being mounted longitudinally adjacent the ends of the return roller."

Findings of Fact and Conclusions of Law

IN THE

UNITED STATES DISTRICT COURT

FOR THE DISTRICT OF UTAH

CENTRAL DIVISION

No. C30-66

PETERSON FILTERS AND ENGINEERING COMPANY and KOMLINE-SANDERSON ENGINEERING CORPORATION,

Plaintiffs,

vs.

THE EIMCO CORPORATION,

Defendant.

This case has been tried to the court, orally argued by counsel, submitted for decision upon written briefs, and by the court taken under advisement. Now considering itself fully advised, the court makes and enters the following

FINDINGS OF FACT

Nature of Action

1. This is an action for infringement of United States Letters Patent No. 3,077,990 granted February 19, 1963, to John G. Peterson, as assignor to Peterson Filters and Engineering Company, for Filter Medium Guide.

Findings of Fact and Conclusions of Law

Parties

2. Plaintiff, Peterson Filters and Engineering Company (hereinafter "Peterson"), is a Utah corporation having its principal place of business in Salt Lake City, Utah.

3. Plaintiff, Komline-Sanderson Engineering Corporation (hereinafter "Komline"), is a New Jersey corporation having its principal place of business in Peapack, New Jersey.

4. Defendant, The Eimco Corporation (hereinafter "Eimco"), is a Delaware corporation having a regular and established place of business in Salt Lake City, Utah.

Status of Plaintiffs

5. Plaintiff Peterson is now and since February 19, 1963, has been the owner of United States Patent No. 3,077,990 in suit.

6. Plaintiff Komline is now and since July 12, 1965, has been the exclusive licensee under United States Letters Patent No. 3,077,990 in suit in the "sanitary field", which has also been defined as the "municipal sewerage treatment field". Pursuant to its license agreement with Peterson, Komline has the unrestricted right to bring suit under United States Letters Patent No. 3,077,990 for asserted infringements thereof which occur only in the "sanitary field", that is, the "municipal sewerage treatment field" and the restricted right "for a period of one year from the date of the agreement" to institute suit or suits

against a third party for asserted infringement that extends "into other than the municipal sewerage treatment field".

Subject Matter of Litigation

7. This litigation is concerned with a particular filter web or belt aligning mechanism or device for use with one type of rotary drum vacuum filter employed in separating solids from liquids, namely, a continuous filter medium removal drum filter, sometimes referred to as a belt discharge filter, or a drum filter "having a separate cake discharge section". The belt discharge filter includes a filter drum —a cylindrical member having closed ends that varies in diameter between eighteen inches and fourteen feet and in face width between one and fourteen feet. The drum has a perforated deck surface which, in operation, is covered for the greater part of its periphery by a filter medium or web. The perforated deck is connected by pipes to an automatic rotary valve. A portion of the drum covered by the filter medium is immersed in a tank containing slurry and rotated. By means of the rotary valve, a vacuum is pulled on the underside of the filter drum while it is immersed in the slurry and for a short period thereafter. The liquid phase of the slurry is drawn through the filter medium to the interior of the drum and the solids are deposited on the surface of the filter medium. As the drum rotates, the filter medium on which the solid material has been deposited leaves the slurry and, as the drum continues its rotation, the filter medium is withdrawn from the perforated surface of the drum and passes over a roller called a dis-

charge roller. At the discharge roller an abrupt change in the direction of travel of the filter medium causes the cake to fall off the medium. The filter medium or belt then passes (a) directly to the return roll (two-roll system), or (b) over one or more wash or idler rolls and thence to the return roll (three and five roll systems). From the return roll the medium passes directly back to the drum, where it again engages the perforated deck of the drum for a repetition of the filtering cycle.

8. In normal operation a filter belt which is part of a rotary vacuum drum filter apparatus tends to track laterally to the left or right and, if not corrected, will mistrack on the filter drum and expose some of the perforated area of the drum that should be covered by the belt. When this occurs, the raw slurry in the tank will be drawn into the filter drum and then the pipes and valves therewithin. The filtrate will be contaminated and eventually the filter will become inoperative.

9. Mistracking occurs for many reasons, such as the practical impossibility of manufacturing a filter drum having perfect symmetry, misalignment of one or more of the rolls of the filter apparatus, variations in the load of filter cake carried by the belt, and incomplete discharge of filter cake from the belt. Because of these variables, the belt can mistrack to either side of the drum.

10. It is most important that the filter belt be sufficiently aligned so that no portion of the drum perforations

are exposed to the raw slurry. It is not desirable that misalignment occur at other locations of the filter apparatus, but moderate misalignment at rolls such as the return roll will not substantially impair operation of the apparatus to the extent that it does not affect the positioning of the filter medium on the drum.

11. Wrinkles often occur in a filter belt made of cloth. Wrinkles occur in most rotary vacuum filter apparatus employing cloth belts. Lack of proper alignment of the belt when it is being fabricated is one cause of wrinkles.

Disclosure of the Peterson Patent in Suit

12. U. S. Patent No. 3,077,990 to Peterson has for its object avoiding wrinkling in the filter belt and tracking the belt properly back onto the filter drum. The endless belt is provided with continuous beads at opposite side edges thereof and passes over the filter drum and then, in its path of travel, over a discharge roll, two idler rolls, a return roll, and then back onto and around the drum. The Peterson patent discloses guide rollers as part of the apparatus, one pair of guide rollers bearing against a bead at each side of the belt to urge the belt outwardly on each side by its lateral stretching and thus smooth out wrinkles in the belt. Figures 3, 4 and 6 of the drawings show and the specification discloses resilient means in the forms of springs which are attached to the two pairs of guide rollers and continuously urge the rollers away from the center line of the belt. By the use of such resilient means the belt is automatically centered with respect to the filter drum

and mistracking with respect to the drum is automatically corrected.

13. Of the figures of the drawings that show a resilient means or springs for correcting mistracking of the belt, Figures 4 and 6 show both the guide rollers and the return roll. In each of Figures 4 and 6 the guide rollers are in contact with the beads at the side edges of the belt while the belt is also in contact with the return roll. In Figure 3 of the drawings no return roll is illustrated, although the filter drum is shown. The specification states that the return roll is not shown in Figure 3 and there is no statement in the specification that the return roll must be in contact with the belt at the same time that the guide rollers exert tension across the belt. There is no teaching in the patent disclosure that any such relationship is necessary in order to have the guide rollers function properly, and I find that no such relationship is necessary.

14. The filter belt cannot first contact the filter drum at a position at the bottom of the drum when the drum is rotating with its axis in a substantially horizontal plane. Such contact would leave portions of the perforated drum surface exposed to raw slurry in the tank before the belt contacted the drum. Instead, the belt must contact the drum at a location prior to contact with the tank slurry. A conventional example of belt-drum contact is shown in Figure 1.

15. Figures 1 and 3 are stated to be schematic drawings. In Figure 3, for convenience of illustration, the

drawing shows the filter drum directly over the filter belt if the view is a side elevational view. Since such a position would not be operable, it is apparent that the illustration of Figure 3 is not a side elevational view.

16. According to testimony of plaintiffs' expert witness and the inventor, other figures, such as 2, 4 and 6, illustrate the apparatus with the filter belt in contact with the return roll in any position between the point of tangency of the filter belt when it first contacts the return roll and the point of tangency when the filter belt leaves the return roll. Defendant's expert witness did not deny that the drawings could show this relationship. In those figures where the guide rollers act on the belt while the belt is in contact with the return roll, neither the specification nor the drawings limit the relationship of the belt and return roll to a position in which the filter belt is directly atop the return roll.

The Patent Claims

17. The patent in suit contains two claims, the second of which is written in dependent form and incorporates the recitations of the first by reference. Claim 1 is written in a form in which the general apparatus already known to the art is first set forth, and then the improvement is recited in terms that relate back to and specifically mention those parts of the apparatus that are known. It was agreed by witnesses for both parties that the preamble of the claim recites apparatus known to the art.

18. The improvement claimed by the patentee is means for tracking the filter medium back to the filter drum. It includes two pairs of guide rollers mounted adjacent each end of the return roller with the filter medium between them and arranged to move laterally across the path of travel of the filter medium and to bear against the beads at the edges of the filter medium or belt. Resilient means are recited as being attached to the guide rollers so that the rollers bear against the beads to stretch the filter medium and to center it in relation to the return roll and the filter drum. There are means supporting each pair of rollers. Claim 2 is essentially the same as claim 1 except that the resilient means are specifically described as springs. The filter medium aligning, stretching and tensioning device disclosed and described in patent in suit No. 3,077,990 and claimed in claim 1 thereof comprises, in combination, essentially and more particularly five structural components or elements, to wit:

(1) a return roller

(2) a filter medium having "beaded edges"

(3) two pairs of guide wheels (or rollers)

(4) resilient web tensioning devices, such as springs

(5) mounting means for the guide wheels (or rollers)

and the following specific directives or requirements for the assemblage of these structural components to achieve particular and specified functions, to wit:

(6) Each of the two pairs of rollers are to be mounted

(a) one adjacent each end of the return roller

(b) in substantial contacting relation

(c) with the filter medium therebetween

(d) in a position to bear against the bead at each edge of the filter medium, and

(e) arranged to move laterally in respect to the path of travel of the web.

(7) The resilient means (springs in claim 2) are to be attached to said guide wheels (rollers) in position so that the guide wheels (rollers) bear against the bead at each edge of the filter medium to

(a) stretch the filter medium therebetween and

(b) center it with respect to the return roller and the filter drum.

(8) The mounting means for the guide wheels (rollers) are to comprise means to support each pair of guide wheels (rollers)

(a) in position on the filter medium and

(b) biased against the adjacent bead at the edge thereof.

The Validity Issue

19. This court finds that the element and its function of the apparatus claimed in the Peterson patent, which is not found in any of the prior art patents cited by the Patent Office in the course of the prosecution of the Peterson application or any additional prior art cited by defendant, is the resilient means or springs attached to the guide roll-

ers in position so that the rollers bear against the beads of the filter belt to tension and center the belt.

20. The only patent referred to by defendant at the trial that shows or describes any springs or resilient means is U. S. Patent No. 2,880,875 to Alston, which was cited by the Patent Office. Alston discloses coil springs secured to eyelets on a filter belt, not to guide rollers. The filter belt of Alston sags and forms a liquid-receiving basin with a weight such that the belt is further supported by a metal, open-mesh belt beneath it. The springs of Alston function to reduce stress on the belt due to weight of liquid when the belt has sagged to form a basin-like structure. Both expert witnesses testified that the springs of Alston did not act to center or correct mistracking of the filter belt of Alston. There is no disclosure in the prior art of coil springs having the function of those in the patent in a similar combination of elements.

21. There is no suggestion in the prior art brought to the attention of the Court that the coil springs of Alston can be attached to guide rollers of an apparatus such as that of the Peterson patent and used in the manner in which they are used in the patented apparatus. Alston is not in the field of rotary vacuum belt filters and no vacuum is applied. One of ordinary skill in this art would not find it obvious to use coil springs in the manner of the patented apparatus. None of the prior art shows any resilient means attached to guide rollers to center a filter belt with respect to a filter drum and to apply tension to the belt.

22. Defendant's expert witness, Weems, national sales manager of the defendant corporation, testified that substitution of resilient means for non-resilient means in the prior art would be within the skill of the art although a change in function accompanied the substitution. The court is of the opinion that this opinion did not overcome the indications in the record to the contrary and the presumption of validity attaching to a patent. No prior art was brought forth by defendant to show the obvious nature of the claimed apparatus and its function; while the Allis patent and the Koppehele patent were not considered by the patent office, the court is of the opinion that they separately or in combination did not disclose the plaintiffs' invention and that representative of each group of prior art patents which defendant alleges anticipates an element of the plaintiffs' apparatus is a patent cited by the U. S. Patent Office against the Peterson application.

23. Plaintiff Peterson has never made a commercial embodiment of an apparatus according to that claimed in the patent in suit. Plaintiff Komline has concluded contracts of sale with Bechtel Corporation and Kawaecki Chemical Corp. for rotary vacuum belt filters employing the claimed apparatus. Requests for or inquiries concerning a license under the patent in suit have been made by two other companies that are substantial factors in the sanitary field. Of the five companies that are substantial factors in the field, excluding the defendant, only one has not sought a license under the Peterson patent.

24. As of (a) the date on which John G. Peterson filed the application for the patent in suit, March 7, 1960;

(b) the date on which the patent in suit was granted, February 19, 1963; (c) the date on which Peterson granted a license under the patent in suit to Komline, July 12, 1965; (d) the date on which this action was instituted, February 23, 1966; and (e) the date on which the trial of the action was concluded, May 17, 1967; neither plaintiff had ever installed any apparatus for commercial use embodying the subject matter of the patent in suit. Defendant did not meet its burden of showing by clear and convincing evidence that the apparatus of the Peterson patent is inoperative. Plaintiffs produced for demonstration purposes at trial a small but commercial rotary vacuum belt filter according to the Peterson patent. The guide rollers of the filter were movable to various locations in the path of travel of the filter belt. In the position substantially as shown in Figure 6 of the drawings, the apparatus was operative. Defendant's expert witness testified that the unit was operative with a filter medium of the type having coil springs within envelopes at the edges of the medium. These envelopes are beads within the scope of the Peterson patent.

The Infringement Issue

25. Defendant Eimco manufactures and sells, *inter alia,* rotary vacuum belt filters which are utilized by defendant's customers in the separation of solids from the liquid phase of slurries. Defendant sells to customers in the sanitary field and in the industrial field.

26. The filter medium or belt which is utilized on Eimco filter apparatus is maintained in alignment with the filter

drum by means of beaded belt edges that cooperate with pairs of guide rollers having resilient springs attached to them to effect alignment of the filter belt on the drum.

27. Defendant manufactures and sells rotary vacuum belt filters in which guide rollers having springs attached to them as claimed in claims 1 and 2 of the Peterson patent are positioned at various locations along the path of travel of the filter belt. In some machines two opposed pairs of guide rollers are positioned at one location; in other machines two pairs of guide rollers are at one location and two other pairs at another location of the filter belt.

28. In a typical accused apparatus of defendant comprising a filter drum and, in order of travel of the filter belt from the drum, a discharge roll, an idler roll, a return roll, and then the drum, again, defendant has located its pairs of guide rollers having springs attached thereto to center and track the filter belt in all positions except between the return roll and the filter drum. Due to the structure of the apparatus, access to guide rollers mounted other than between the filter drum and the discharge roll is difficult because of interference by the frame of the apparatus and installation of auxiliary equipment. However, a letter sent by a regional sales manager of defendant states that it became standard with Eimco to place its guide rollers, referred to as Edgetrack rollers, between the idler roll and the return roll.

29. The Eimco Edgetrack aligning devices have been located on its filters in every instance in a position at an

otherwise unsupported span of the filter web. In no instance has Eimco's aligning device been mounted laterally adjacent the end of the return roll or any other roll. In most instances on the defendant's three-roll system, defendant's aligning device is located between the filter drum and the discharge roller. In a few instances the defendant's aligning device has been located between the return roller and the next preceding roller in its three-roll system. In all instances in defendant's two-roll system, defendant's aligning device has been located between the filter drum and the discharge roller. In all instances in defendant's five-roll system, defendant's aligning device has been located between the filter drum and the discharge roller. Defendant's guide rollers do not contact the filter belt when the belt is in contact with a roll, such as the discharge roll or return roll.

30. The claims of the Peterson patent locate the guide rollers adjacent the ends of the return roll. Defendant's guide rollers have been located as close as nine inches from the return roll and adjacent the ends thereof, but not laterally adjacent to such ends.

The File Wrapper of the Peterson Patent

31. According to standard dictionaries, the word "adjacent" can mean either in the general vicinity of or in direct contact with. Adjacent is a broad term, and defendant's accused apparatus with guide rollers located between the return roll and the next roll in the path of travel of the filter belt (usually the idler roll) are adjacent the

ends of the return roll unless there is a teaching to the contrary in the patent so as to limit the definition of adjacent, or unless its meaning is restricted by the doctrine of file wrapper estoppel.

32. There is no teaching in the patent in suit that limits the meaning of the word adjacent as used in the phrase "adjacent each end of the return roller" in claim 1 to a position laterally adjacent the ends rather than adjacent the ends in the path of travel of the belt. There is nothing in the disclosure of the patent that restricts the guide rollers to such a laterally adjacent position.

33. The application that resulted in the patent in suit was filed March 7, 1960 in the U. S. Patent Office with 17 claims. These claims were later cancelled and the two claims that are presently in the patent in suit were added.

34. The phrase "adjacent each end of the return roller" first appeared in the claims in claim 18, which became claim 1 of the patent in suit. Claim 18 was added to the application by an amendment received in the U. S. Patent Office on April 23, 1962 and designated as Amendment B. Amendment B was filed in response to Paper No. 5, which was an official action of the U. S. Patent Office mailed October 25, 1961.

35. The phrase "adjacent each end of the return roller" was added in response to a rejection of the former claims as being "indefinite and somewhat misdescriptive." This rejection was made in the official action designated Paper

No. 5. In that official action the Examiner objected to the phrase "medium engaging means being centered in relation to said filter drum," which was present in claim 1, lines 10 and 11. The Examiner stated that this was contrary to the disclosure of the application "* * * wherein the medium engaging means are shown adjacent the outer edges of the drum rather than the center thereof."

36. From the testimony of Burns, plaintiffs' expert, and an examination of the file wrapper of the Peterson patent, I find that the Examiner meant by this rejection that the guide rollers could not be in line with the center of the filter drum because in the drawings and the specification the guide rollers were disclosed as near the outer edges of the drum and that such a position is necessary in order for the guide rollers to contact the beads on the outer edges of the belt. In Paper No. 5 the Examiner that said the rollers that were shown "adjacent" the outer edges of the drum. The applicant responded to this rejection by locating the rollers adjacent the ends of the return roll, which, with respect to the filter belt is the same location as the outer edges of the drum.

37. In Paper No. 5 the Examiner also rejected claims 1 to 12 as unpatentable over U. S. Patent No. 2,880,875 to Alston in view of British Patent No. 812,197 or vice versa, and claims 14 to 16 as fully met by the British patent. The phrase "adjacent each end of the return roller" was not placed in claim 18 (claim 1 of the patent) to meet this basis of rejection and thus was not inserted in order to avoid

a rejection on the prior art. There is no indication that in this rejection on the prior art the Examiner required claim language that the guide rollers be mounted laterally adjacent the ends of the return roller as contrasted with being mounted longitudinally adjacent the ends of the return roller.

38. The Examiner did not, in the rejection over a combination of the Alston and British patents, require that the guide rollers be claimed with respect to the return roll so as to distinguish this prior art. In the British patent, the guide rollers 3 contact the belt and the bead while the belt is in contact with the rollers 2. The Alston patent shows no guide rollers in contact with a belt bead. Consequently, locating the guide roller adjacent each end of the return roller would not have obtained allowance of any claim because it did not distinguish the relative locations of the rollers 2 and 3 of the British patent.

39. In making his rejection on the prior art in Paper No. 5, the Examiner also said that the "* * * means for stretching the edges of the belt of Alston is substantially similar to the species of Figs. 3, 4 and 6 of applicant's. * * *" Since the Examiner had stated that the prior art was similar to species of these figures, and in Figures 4 and 6 the guide rollers are shown laterally adjacent each end of the return roll, the phrase in question was not added to issued claim 1 to avoid the Examiner's rejection on the prior art, because, in view of the Examiner's statements, such addition would have been fruitless. This is borne out

by the fact that in the Remarks accompanying Amendment B, Peterson did not argue that the relative locations of the guide rollers and return roll avoided the prior art.

40. In claim 1 of the patent the word "adjacent" is also used to define the relative locations of the return roll and the filter drum. Clearly the return roll and the filter drum in the Peterson apparatus are not in contact with each other and are longitudinally adjacent in the path of travel of the filter belt. The word "adjacent" in the phrase "adjacent each end of the return roller" can also mean longitudinally adjacent in the path of travel of the filter belt.

The Doctrine of Equivalence

41. While defendant's apparatus with guide rollers at locations other than that between the return roll and the preceding idler roll do not meet the literal terms of the claims, in that they were not mounted adjacent the ends of the return roller, the guide rollers at other locations in the path of travel of the belt perform substantially the same function as guide rollers mounted between the return roll and the idler roll. That function is to correct mis-tracking of the filter belt, to track the belt back to the filter drum and center it with respect thereto, and to stretch the belt between opposed pairs of guide rollers.

42. In all positions between rolls or the drum and in the path of travel of the belt, the guide rollers perform their function in substantially the same way as guide rollers

mounted between the return roll and idler roll. The mode of operation is the same, i.e., to laterally displace the filter belt to one side so that the belt will track by planar motion on to the following roll in the path of travel of the belt. When the guide rollers contact the filter belt while the belt is in contact with the return roll or any roll other than the filter drum, the rollers still act to move the belt laterally by slippage and the belt then tracks by planar motion on the next roll in its path of movement. Since the primary object of the invention and the accused device is the centering of the stretched filter medium on the drum, the court regards the precise location of the guide rollers with reference to the rollers as incidental; and particularly with reference to the centering of the filter medium on the filter drum the devices operate in substantially the same way and perform substantially the same function to accomplish substantially the same result. Moreover, it is found that any difference in location of the guide rollers between the patented device and the accused device would be an equivalent variation which would be obvious to one possessing ordinary skill in the art. In all positions between rolls or the drum and in the path of travel of the belt, the guide rollers accomplish substantially the same result. In all such positions the guide rollers stretch the filter medium between opposed pairs of guide rollers, correct mistracking of the filter belt and track the belt back to the filter drum, centering it with respect to the drum.

43. In U. S. Application Ser. No. 315,658, filed October 11, 1963 in the name of Steven S. Davis, an employee of

defendant, which application was stated by defendant to constitute a written description of the accused apparatus, the applicant indicated that the guide rollers may be placed in any position between rolls, or between the filter drum and a roll, and makes no distinction as to the operation or effectiveness of the guide rollers in such positions.

44. At Monsanto Company's John J. Queeny plant, St. Louis, Missouri, two of defendant's three-roll filters performing substantially the same operation were installed, one with pairs of guide rollers located between the filter drum and discharge roll, the other with pairs of guide rollers between the idler roll and return roll. Defendant's expert also testified that the basic action at various locations between rolls is the same.

45. By use of the word "stretch" in the claims and disclosure, the Peterson patent refers to a tensioning of the belt between opposed pairs of guide rollers. The belt, itself, need not be pulled out of shape, since this would do harm to the belt. Tensioning of the belt to remove wrinkles therein is one of the advantageous functions of the guide rollers. Defendant's device is designed to tension and stretch its filter belts.

Recent Changes in Defendant's Apparatus

46. In recent instances in Eimco's Edgetrack device, the guide rollers have been separated by a positive stop bar to provide spacing equal to the thickness of the edging of the web plus 1/64 inch and are designed to pull free of the beaded edge of the belt when forces in excess of twelve

pounds are applied thereto. Such variation still meets the terms of the claims because the rollers are "in substantial contacting relation." Spacing the upper roller 1/64 inch above the upper surface of the belt makes no substantial difference in the essential function of the guide rollers except by way of extent or degree.

47. On recent occasions defendant has modified its apparatus in use so that one pair of guide rollers is set inwardly of its bead by about ¾ inch. In connection with such use for about the first two days all guide rollers are in contact with their respective beads and not set inwardly. Both the Davis application and defendant's instruction booklets, which were said by defendant to be writings disclosing the accused apparatus, describe apparatus with both pairs of guide rollers in contact with the beads of the belt. However, even if one pair is set inwardly about ¾ inch, conventional belt bias, if uncorrected, may result in a diminution of effective belt width to bring the inset pair of rollers into contact with their bead. Substantially the same amount of tension would then be applied by both opposed pairs of guide rollers to their beads and the belt.

48. No matter how defendant adjusts its guide rollers, the rollers can easily be adjusted by defendant's customers to bring them into contact with the bead and the defendant's apparatus in fact is designed, manufactured and arranged to readily permit and encourage the lateral tensioning of the filter medium by the operation of two pairs of rollers as taught by plaintiffs' invention. Defendant's

operating instructions teach such bead-contacting adjustment to the customer and are left with the customer. Adjustment wherein both opposed pairs of guide rollers are in contact with the beads at each side of the belt is advantageous in that it provides dewrinkling tension on the belt not present when one pair of rollers is out of contact with its bead. It also provides that a belt mistracking toward either side or irregularly will be automatically urged toward a position in which mistracking is corrected and the belt centered with respect to the filter drum, although there may be certain other disadvantages as compared with a single pair of guide rollers operating on one side only of the filter medium, such as decreased wear or strain on the filter medium. The plaintiffs' patent in suit does not read on a single pair of guide rollers designed to operate on one side or the other of the filter medium and not to tension the belt laterally away from another pair of guide rollers on the opposite side of the filter medium.

The Patent Misuse Issue

49. The assertion that plaintiffs have misused the patent in suit and must be denied relief until such misuse has been purged is based on a clause in paragraph V of the License Agreement between plaintiffs dated July 12, 1965. This clause gives licensee (Komline) "the right for a period of one (1) year from the date of the agreement to institute or bring any suit or suits for infringement against a third party whose infringing activities extend into other than the 'municipal sewerage treatment field.'

In such event, the Licensee shall assume all the costs and shall be entitled to the full amount of any recovery."

50. Rotary vacuum belt filters are used in the sanitary field (municipal sewage) and industrial field (all other applications). In the sanitary field, and specifically with respect to dewatering of sewage sludges, plaintiff Komline manufactures and sells approximately two out of three filters, due primarily to sales of its coil spring filters. With respect to all equipment for use in the sanitary field, Komline manufactures and sells between two and three percent and is a relatively insignificant factor. In both the sanitary and industrial fields, defendant Eimco has manufactured and sold about 60 percent of the rotary vacuum belt filters now in use where those filters employ cloth belts suitable for use as part of the apparatus of the Peterson patent.

51. In or around April 1964, Komline became aware of the fact that in the industrial field (as distinguished from the municipal sewerage treatment field), Komline's Flexibelt filter might not compete successfully with Eimco's cloth belt filter equipped with Eimco's Edgetrack aligning device. At about the same time Komline's patent counsel informed Komline of the existence of the Peterson patent and "in the spring of 1964, probably in March" 1964 T. R. Komline had one or more conversations with Mr. C. Lynn Peterson relative to the acquisition by Komline-Sanderson of rights to or under the Peterson patent in suit. Thereafter, on August 27, 1964, Komline's patent counsel rendered to Komline a report entitled "Peterson Patent Evaluation" and, pursuant to this report,

Mr. Komline again spoke to Mr. Peterson with reference to the Peterson patent. These talks culminated in the April 28, 1965, letter agreement. Pursuant to this agreement Komline would have acquired title to the Peterson patent subject to an exclusive license to Peterson in the Industrial field. Thereafter the agreement was renegotiated and resulted in the license agreement dated July 12, 1965. This agreement provided (1) that Komline was to have an exclusive license in the municipal sewerage treatment field, (2) that Komline would have no right to use the Peterson device in fields and industries other than the field of municipal sewerage treatment, and (3) that Komline could bring suit, at Komline's expense, against infringers in the municipal sewerage treatment field, and for a period of one year from the date of the agreement, against infringers whose activities extend into fields other than the municipal sewerage field, i.e., into the Industrial field, as aforesaid. The activities of Eimco were a subject of discussion at the negotiation meetings between the two companies' representatives and that the provision extending to Komline the right within one year from the date of the agreement to institute a suit or suits for infringements of the Peterson patent against a third party whose activities extend into other than the municipal sewerage treatment field was inserted at Komline's request and for payment by Komline to Peterson of a consideration in an amount of $5,000 in excess of the consideration theretofore agreed upon. Komline did not have nor did it acquire monopoly power in the manufacture and sale of rotary vacuum cloth belt filters, which is the field in which the Peterson apparatus has found use.

52. Neither of plaintiffs utilized the provision of paragraph V of the Peterson-Komline License Agreement quoted hereinbefore. There is no showing that the agreement had any influence or effect on competition and the evidence demonstrates particularly that it had no influence on the defendant. Peterson joined Komline as a party plaintiff in this action. Eimco manufactures and sells the accused apparatus for use in the sanitary as well as the industrial field. The one-year term of the right expired on July 12, 1966.

53. The defendant has failed to prove by a preponderance of the evidence that the plaintiffs' patent has been misused or that on equitable or legal grounds plaintiffs should be barred from asserting the patent as against the defendant.

Damages

54. The Peterson patent in suit issued on February 19, 1963. Defendant became aware of the patent shortly after it issued and defendant's counsel received a copy of the Peterson patent sometime in March, 1963. The first accused Edgetrack apparatus sold by defendant was sold on July 25, 1963 to American Cyanamid Company, Michigan City, Indiana, and installed on a later date. At the time of sale, defendant had been in possession of a copy of the Peterson patent for at least four months.

55. Defendant's first sale of an accused apparatus and subsequent sales were made with full knowledge of the Peterson patent but under the contention that the patent

was invalid or was of such limited application as not to be infringed by defendant's devices.

From the foregoing Findings of Fact, the court now draws the following:

Conclusions of Law

1. The court has jurisdiction over the parties and the subject matter of this civil action under 28 United States Code §1338, and venue is properly laid in the District of Utah under 28 United States Code §1400(b).

2. The Peterson patent is presumed to be valid and defendant has the burden of establishing its asserted invalidity by clear and convincing evidence.

3. Defendant has not sustained its burden of proof and the Peterson patent is adjudged valid.

4. The accused Edgetrack apparatus manufactured and sold by defendant infringes the Peterson patent regardless of the location of the opposed pairs of guide rollers of the apparatus in the path of travel in the filter belt. All such locations are equivalent because the two pairs of guide rollers so located perform substantially the same function in substantially the same way and achieve substantially the same result.

5. There is no file wrapper estoppel which precludes applying the doctrine of equivalence to the claims of the Peterson patent and particularly the term "adjacent the

ends of the return roller'' because this phrase was inserted to meet a rejection that the claims were indefinite and somewhat misdescriptive, not a rejection as unpatentable over the prior art.

6. Defendant infringes the Peterson patent by manufacturing and selling rotary vacuum belt filters employing two pairs of guide rollers, one located on either side of the filter belt, designed and easily adjustable for simultaneous contact with belt beads on both sides of the filter medium.

7. The License Agreement between plaintiffs, together with the position of plaintiffs and defendant in this field and the acts of plaintiffs subsequent to execution of the License Agreement, do not constitute misuse of the Peterson patent.

8. Judgment will be entered in favor of plaintiffs and against defendant, and defendant permanently enjoined against continued infringement of U. S. Patent No. 3,077,990. Damages are awarded to plaintiffs and an accounting is ordered to determine the total amount of actual damages. Costs are awarded to plaintiffs, such costs to be taxed by the Clerk. Plaintiffs within 15 days are directed to serve and lodge with the Court a proposed form of decree in harmony with these conclusions to be settled upon notice.

Dated this 14th day of August, 1967.

/s/ A. Sherman Christensen
United States District Judge

Judgment of the Court of Appeals for the Tenth Circuit

This cause came on to be heard on the transcript of the record from the United States District Court for the District of Utah and was argued by counsel.

On consideration whereof, it is ordered and adjudged by this court that the judgment of the said district court in this cause be and the same is hereby affirmed.

WILLIAM L. WHITTAKER, Clerk

By Gladys E. Hobbs
Deputy Clerk.

Judgment of the District Court

The above-entitled action having come on to be heard before the court upon open trial, and witnesses having been heard, evidence having been presented, briefs having been filed in behalf of the respective parties and the cause having been fully tried before the court, and the court having entered Findings of Fact and Conclusions of Law filed in the United States District Court for the District of Utah, Central Division, on August 14, 1967, it is now

ORDERED, ADJUDGED AND DECREED as follows:

1. Plaintiff, Peterson Filters and Engineering Company, is the owner of United States Letters Patent No. 3,077,990, issued to it on February 19, 1963, in the name of John G. Peterson and entitled "Filter Medium Guide."

2. Plaintiff, Komline-Sanderson Engineering Corporation, is now and since July 12, 1965 has been exclusive licensee under United States Letters Patent No. 3,077,990 in the sanitary field, also defined as the municipal sewerage treatment field.

3. Defendant, The Eimco Corporation, has infringed claims 1 and 2 of said United States Letters Patent No. 3,077,990 by its manufacture and sale of rotary drum vacuum belt filters employing tracking and tensioning apparatus comprising two pairs of guide rollers, one pair located on either side of and in the path of travel of the filter belt, where said pairs of guide rollers were each designed and easily adjustable for resilient, simultaneous contact with beads on both sides of the belt.

4. Defendant, The Eimco Corporation, and its officers, agents, servants, employees and attorneys, and all persons

in active concert or participation with it who receive actual notice of this Judgment and Decree, are, during the remaining term of United States Letters Patent No. 3,077,990, hereby permanently enjoined and restrained from making, using or selling, within the United States, its territories or possessions, rotary drum vacuum belt filters employing tracking and tensioning apparatus comprising two pairs of guide rollers, one pair located on either side of and in the path of travel of the filter belt, where said pairs of guide rollers are each designed and easily adjustable for resilient, simultaneous contact with beads on both sides of the belt, or otherwise infringing claims 1 and 2 of said United States Letters Patent No. 3,077,990.

5. Plaintiffs are entitled to recover damages together with interest thereon as may be fixed by the court pursuant to USC Title 35, Section 284, and an accounting is ordered to determine the total amount of actual damages.

6. Plaintiffs are awarded costs in this action, such costs to be taxed by the Clerk of the Court.

A. SHERMAN CHRISTENSEN
United States District Judge

Dated: Salt Lake City, Utah
Oct. 3, 1967

Approved as to form:

Walter D. Ames
Of Counsel for Plaintiffs

Mark N. Donohue
Of Counsel for Defendant

Plaintiffs' Ex. 1, R. 655

Feb. 19, 1963 J. G. PETERSON 3,077,990

FILTER MEDIUM GUIDE

Filed March 7, 1960 2 Sheets-Sheet 1

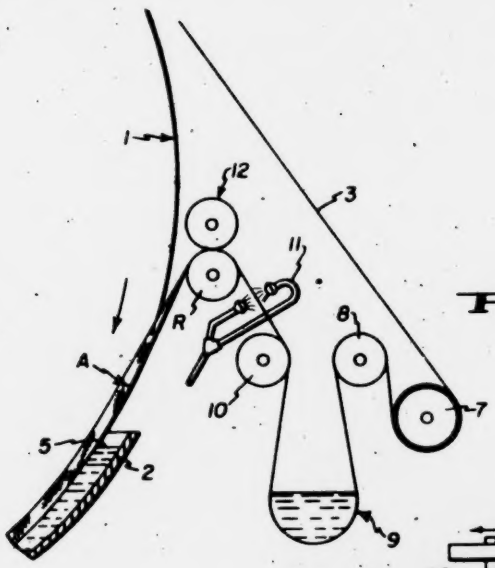


Fig.-1

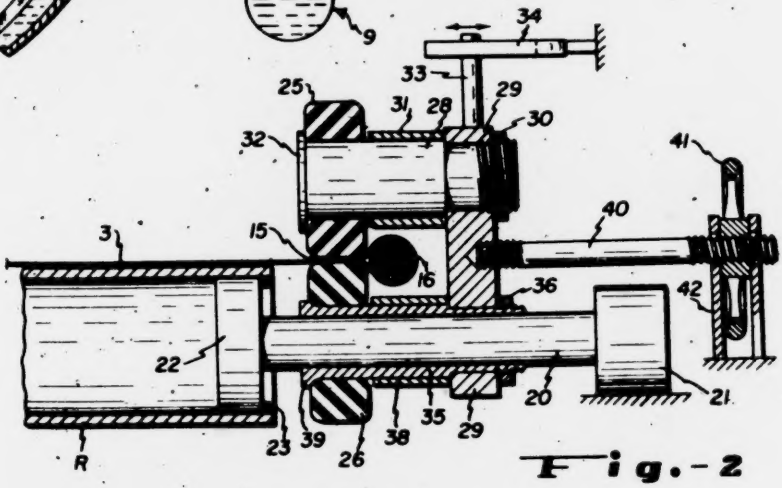


Fig.-2



Fig.-3

INVENTOR.
John G. Peterson
BY
McCrum & Edwards
ATTORNEYS

Feb. 19, 1963 J. G. PETERSON 3,077,990

FILTER MEDIUM GUIDE

Filed March 7, 1960 2 Sheets-Sheet 2

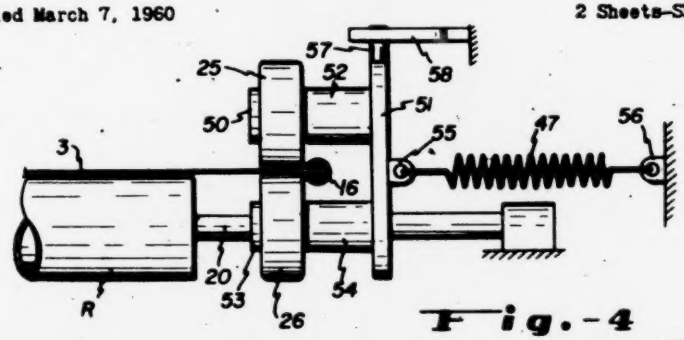


Fig.-4

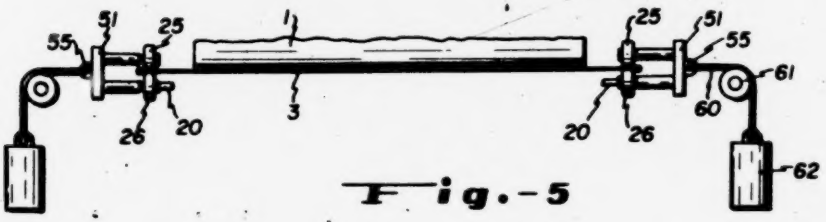


Fig.-5

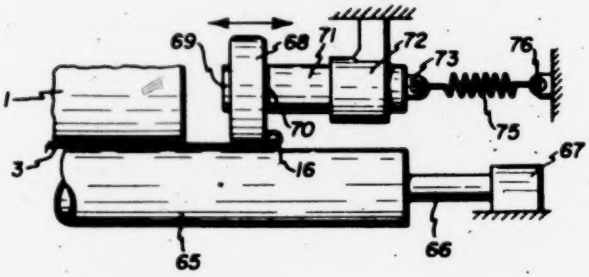


Fig.-6

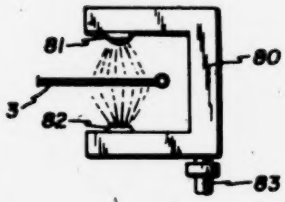


Fig.-7

INVENTOR.
John G. Peterson
BY
Brumbaugh & Edwards
ATTORNEYS

United States Patent Office 3,077,990 Patented Feb. 19, 1963

3,077,990

FILTER MEDIUM GUIDE

John G. Peterson, Salt Lake City, Utah, assignor to Peterson Filters and Engineering Company, Salt Lake City, Utah, a corporation of Utah

Filed Mar. 7, 1960, Ser. No. 13,129
2 Claims. (Cl. 210—401)

This invention relates to improvements in continuous filtering apparatus, and more particularly to improvements in rotary drum apparatus, especially drum filters having a cake discharge and filter medium cleaning section removed from the surface of the drum.

Rotary drum filters using a filter medium formed in an endless band or strip having a length substantially in excess of the circumference of the drum for passing through a cake discharge section spaced from the drum is well known. With such filtering apparatus, however, substantial difficulty has been experienced in maintaining the endless filter medium strip centered on the drum and as it passes through the discharge section. Since a vacuum filter has a drum having a perforated surface which must be covered by the filter medium to maintain suction in the drum for drawing filtrate through the filter medium, the filter medium must be correctly tracked so as to cover the drum surface during filtering operations. In such devices, the filter medium on leaving the drum is looped around and through a series of rollers for discharge of carried cake and eventually back onto the drum surface. As the filter medium returns to the drum surface, however, there is a definite tendency for the endless strip to run off the drum.

It is therefore an important object of the invention to provide a novel filter medium and mechanism for maintaining an endless filter medium centered on a rotary drum and through a discharge section spaced from the drum surface. The invention provides centering of the medium, eliminates wrinkling of the material of the filtering medium either on the drum or in the discharge section, and provides positive tracking for the medium onto the drum without training rods. The mechanism of the invention laterally stretches the filter medium, retarding blinding of its openings and provides for more complete cleaning of the filter medium prior to its return to the filter drum for additional filtering action.

These and other objects and advantages of the invention may be readily ascertained by referring to the following description and appended drawings in which:

FIG. 1 is a partial schematic view of a drum filter with a spaced apart cake discharger for an endless filter medium;

FIG. 2 is a detailed section of part of one embodiment of the invention, illustrating a filter medium tensioning and holding mechanism according to the invention;

FIG. 3 is a schematic view of a modified spring-loaded filter medium holding mechanism, for tracking and centering a filter medium on a drum and providing lateral tension on the medium;

FIG. 4 is a partial detailed view of a modified spring-loaded mechanism for tracking and centering a filter medium;

FIG. 5 is a schematic illustration of a gravity weighted filter medium centering and tensioning mechanism according to the invention;

FIG. 6 is a partial detailed view of another spring loaded filter medium centering and tensioning mechanism; and

FIG. 7 is a schematic view of a filter medium cleaning spray mechanism according to the invention.

In general, the cake discharger of the present invention is applicable to a rotary vacuum drum filter, rotary pressure drum filters, and other similar mechanisms utilizing

an endless filter medium or cake supporting material of a length substantially greater than the circumference of the drum and a cake discharge mechanism spaced from the drum surface, as for example, rotary drum filters shown in Wilson, U.S. Patent No. 2,812,065 and Siebenthal, U.S. Patent No. 2,812,064. In the particular type of filter mechanism, a vacuum drum filter having a perforate cylindrical surface is partially immersed in a fluid to be filtered which is contained in a tank. The endless filter medium covers the mesh surface of the drum during its immersion in the fluid (slurry) and a part of the drum surface above the slurry to provide washing and/or air drying of the cake on the medium. The filter medium is then directed away from the surface of the drum through a series of loops wherein the cake is discharged, the medium is washed and then returned to the drum for subsequent filtering operation.

In the schematic illustration of FIG. 1, a drum 1 (partially shown) is mounted for rotation in a tank 2 for operation as a drum filter according to conventional practices. The Wilson and Siebenthal patents (referred to above) illustrate one mounting construction and means for operating such a drum filter. An endless filter medium 3 is looped around the drum 1 so that it covers the drum through a major part of an arc of revolution. The medium is withdrawn fro mthe drum at an upper poim and it is returned to the drum at a point such as A immediately prior to its contact with a body of slurry 5. The filter medium completely covers the drum deck during the filtering portion of each cycle. In the cake discharge and cake washing section, the filter medium 3 passes over a discharge roller 7 where the filter cake is removed from the medium, either by the reverse bending of the medium or a sluicing fluid, which may be air or water, blown through the medium to remove the cake. The medium is then looped over a roller 8 leading an elongated, free loop 9 over a roller 10 and then past a spray system 11. The filter medium passes through a tracking, centering and tensioning mechanism shown generally by numeral 12 and returned to the filter drum. The centering and tensioning mechanism is explained in detail in detail below. The elongated loop 9 is normally filled with water, forming is called a water loop, shown and explained in detail in the Wilson and Siebenthal patents. The water loop maintains longitudinal tension on the filter medium by virtue of the weight of the water in the loop. The water in the loop may be either contained in an elongated tube or a free pool so that it washes the filter medium.

The filter medium which may be used with the device of the invention is an elongated strip of such material as woven nylon, felt, metallic cloth, screening, nylon taffeta of appropriate mesh, and similar types of filter medium known in the industry. The strip of filter medium is slightly wider than the width of the drum and is substantially longer than the circumference of the filter drum. Its ends are secured together forming an endless filter medium. The ends of the medium may be releasably secured together by means of a hookless fastener, slide fastener, lacing, or the like, as is known in the art. Both edges of the strip are folded back over an elongated core and fastened to the body or web of the strip leaving an enlarged edge, bead, or hem completely along each edge. A portion of such an edge is illustrated in FIG. 2, wherein the edge 15 of the material is turned back on itself around a cord 16. The edge of the material may be sewn to the body, or otherwise fastened to form a pocket around the cord 16. In place of the cord 16 a cable, which may be made of metal, fiber, plastic, rubber, or an endless helical spring may be used as the core for the hemmed edge. It is to be understood that both edges

of the strip are so treated so as to provide the thickened edges on both sides of the medium.

In the embodiment illustrated in FIG. 2, the return idler "R," that is, the roller adjacent the vacuum drum from which the filter medium returns to the drum from the cake discharge section, is mounted on a shaft 20 which is journaled in a pillow block or bearings 21 for rotation. A disc 22 is mounted on the shaft 20, and the disc is pressed internally of the tubular roller R, retained in place by a weldment 23.

The filter medium 3 is maintained centered and laterally stretched by means of rollers 25 and 26 which are closely juxtaposed with the thickened edges 15 therebetween. Thus the core 16 bears against the outer surfaces of the rollers. Upper roller 25 is mounted on a shaft 28 which is mounted in an upright end plate 29 and held by a nut 30. A spacer 31 holds the roller in position, and a shaft stop 32 maintains the roller on the shaft 28. The end plate 29 is mounted on a hollow shaft 35, through which shaft 20 is journaled and is retained in position thereon by means of a nut 36. Roller 26 is, also, mounted and rotates on the hollow shaft 35 being retained in position by stop 39. A spacer 38 maintains positioning of the roller. A connecting rod 40 is threadedly attached to the plate 29 and is operatively engaged with an adjusting wheel 41 mounted in a stand 42 attached to the filter structure. The adjusting wheel is threadedly engaged with the connecting shaft 40 and provides means for adjustment of lateral tension on the filter medium as may be desired. The rollers 25 and 26 are preferably made of nylon, polytetrafluoroethylene plastic, rubber or equivalent material which is essentially non-abrasive toward the filter medium with no sharp corners.

The end plate 29 being mounted on a shaft requires some means for holding it. One such means is shown in FIG. 2, wherein a pin 33 guides in a stationary yoke 34. The pin 33 prevents rotation of the end plate, but is reciprocable in the yoke for tension adjustment of the filter medium.

Adjustment by the hand wheel moves the rollers laterally in relation to the drum (not shown in FIG. 2) and provides centering and/or tracking means for the filter medium as well as providing lateral tensioning on the medium immediately prior to its return to the drum. Thus stretch changes and variations in the medium during operation are readily compensated, as well as filter medium creep on the drum.

In the modification illustrated schematically in FIG. 3, a yoke 45 having upper and lower rollers 25 and 26 are mounted in a manner similar to that of FIG. 2 but, instead of the connecting rod 40, a helical spring 47 is interconnected with each yoke 45. Thus each side of the filter medium runs between the rollers with the core 16 held between the rollers so as to maintain the medium under essentially uniform tension, and it is automatically centered or tracked on the drum 1. For simplification of the illustration, the return roller R and means for mounting the yoke are not shown in FIG. 3, but shown in detail in FIG. 4.

The spring-loaded yoke mechanism is illustrated in detail in FIG. 4, wherein the roller 25 is mounted on a solid shaft 50 which in turn is mounted on plate 51. A spacer 52 maintains the roller 25 in position and end stop on shaft so holds it on the shaft. Roller 26 is mounted mounted on a hollow shaft 53 which is secured to the plate 51 and maintained in position by spacer 54. The shaft 53 is reciprocably mounted on the return roller shaft 20. The helical spring 47 is secured to an eye 55 on the plate 51 and to an eye 56 on the frame providing continuous and essentially uniform tension on the filter medium under the influence of the springs 47.

A pin 57 riding in arms of a stationary yoke 58 prevents rotation of the plate 51, in a manner similar to the device of FIG. 2. The yoke provides reciprocal movement of the plate 51 along shaft 20, but prevents rotation thereof.

In the modification illustrated in FIG. 5, weights operating over pulleys replace the helical spring on the device of FIGS. 3 and 4, also providing continuous tensioning on the filter medium 3. In this case the rollers 25 and 26, mounted similarly to the roller mount of FIG. 4, are mounted on a back plate 51 which in turn is reciprocably mounted over return roller shaft 20. A cable or line 60 mounted over a pulley 61 is secured to the eye 55 at one end and to a weight 62 at the other end. These opposed weights on the ends of the cable 60 provide lateral tension and tracking for the filter medium 3. The weights, of course, may be varied to provide proper tensioning under various conditions of operation.

In the modification illustrated in FIG. 6, a return roller 65 is made substantially wider than the filter drum 1, and is mounted on a shaft 66 journaled for rotation in a pillow block or bearing set 67. The return roller 65 is mounted in a position adjacent the drum, similar to the return roller R, FIG. 1, and a single filter medium tensioning and restraining roller 68 is mounted adjacent each end of the return roller 65, in position to bear against and retain the filter medium edge 16 therebetween. Correct positioning maintains the edge core 16 on the outer side of the roller 68. The roller 68 is mounted on a shaft 69, which is shouldered at 70 to retain the roller 68 in position, and the large portion 71 of the shaft is reciprocably mounted in a stationary mount 72 which is secured to the frame. An eye 73 is secured on the end of the shaft 72, and a spring 75 is attached thereto to provide tension on the filter medium 3. The spring 75 is anchored in an eye 76 secured to the filter frame.

In the modification of FIG. 6 the return roller 65 coacts with the tensioning roller for providing tensioning on the filter medium. This provides a simplified construction for the centering and tensioning mechanism for the filter medium 3.

Cleaning sprays may be provided for the filter medium edge immediately prior to its entrance into the centering and tensioning rollers, and in one form a hollow yoke 80 is provided with upper and lower spray heads 81 and 82 mounted in position to spray the filter medium 3 passing therebetween. The hollow yoke is secured to a fluid source 83 by conventional means. The spray heads may be replaced with wiper blades where desired.

It is obvious that where desired the filter medium holding rollers or wheels may be journaled with bearing sets on their respective shafts. Further, the rollers or wheels may be made replaceable for varying conditions of service or operation.

In operation it has been found that the core or cord in the hem of each edge creeps in respect to the filter medium, probably due to the difference of effective diameter around the drum and rollers which increases the distance of travel in relation to the body of the filter medium itself. It is, therefore, preferable to have each hem or turned back edge loosely on the cord, and to have the core or cord continuous around each edge with minimum bulging at the core or cord joint. When a cord is used for the core, a smooth splice without knots or bulges permits the cord to flow through the hem, in relation to the filter medium, during operation. Thus with any core, whether cord, cable, helical spring, etc., the finished splice is preferably smooth and small so that the core freely moves through the hem without catching and bunching the filter medium.

While the invention has been described by reference to specific embodiments, there is no intent to limit the spirit or scope of the invention to the precise details so set forth.

I claim:

1. In a filter medium tracking and tensioning device for a rotary drum filter having a separate cake discharge

section, an endless filter medium looped over the filter drum and extending through the cake discharge section, which filter medium includes a bead on each edge of the filter medium extending completely therearound, and a filter medium return roller mounted adjacent the filter drum, the improvement which comprises means for tracking the filter medium back to said drum inclusive of a pair of rollers mounted adjacent each end of the return roller, each pair of rollers being mounted in substantial contacting relation and mounted with the filter medium therebetween and in position to bear against the bead at the edge thereof, each said pairs of rollers being arranged to move laterally in respect to the path of travel of the filter medium, resilient means attached to said rollers in position so that the rollers bear against the bead at each side of the filter medium to stretch the filter medium therebetween and to center it in relation to the return roller and the filter drum, and means for supporting each

pair of said rollers in position on said filter medium and biased against the adjacent bead at the edge thereof.

2. A device according to claim 1 in which each said pair of bead contacting rollers is spring biased laterally away from the filter medium so as to provide essentially uniform tensioning on the filter medium.

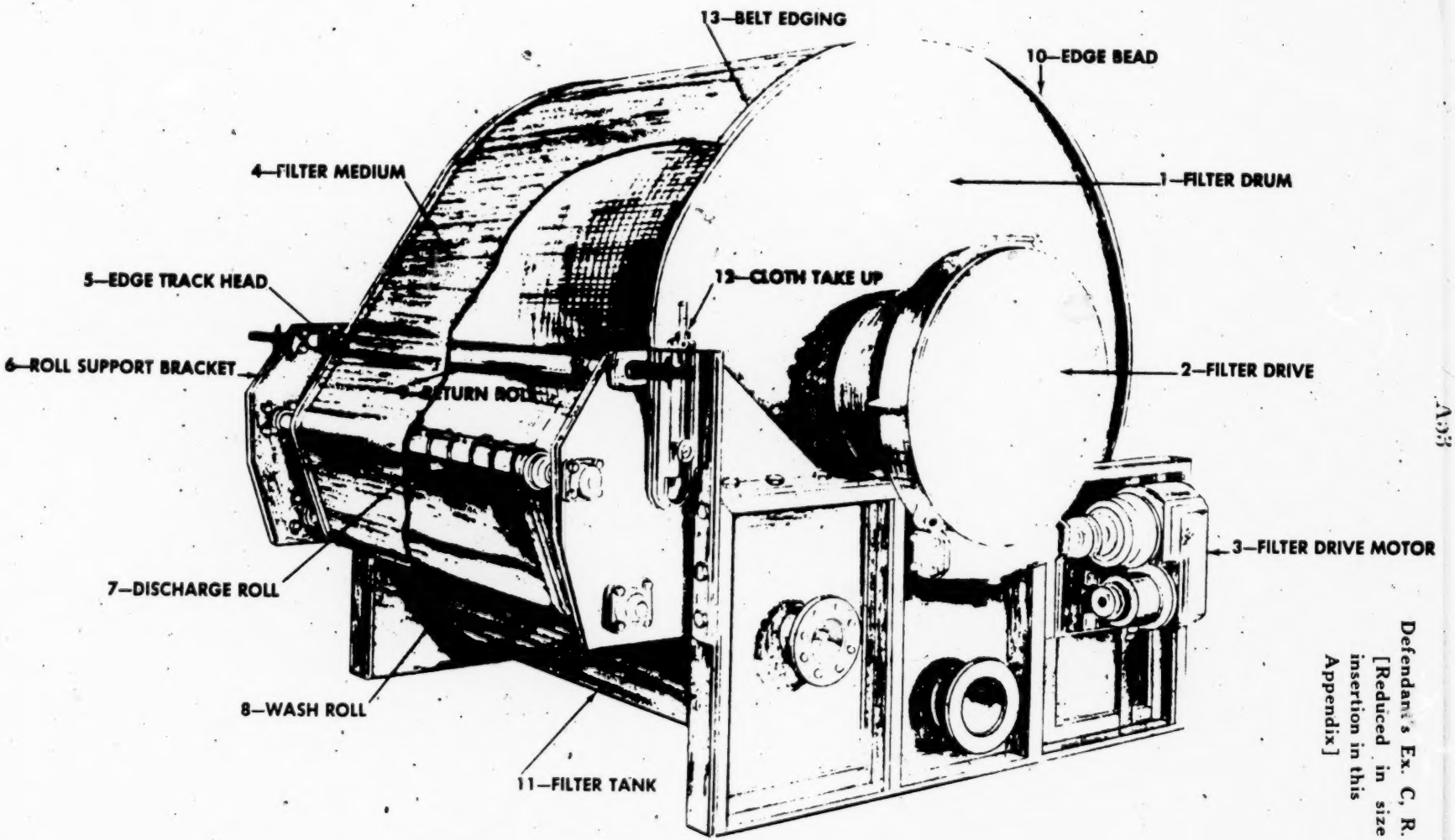
References Cited in the file of this patent

UNITED STATES PATENTS

877,631	Clark	Jan. 28, 1908
954,466	Robinson	Apr. 12, 1910
2,330,923	Robins	Oct. 5, 1943
2,880,875	Alston	Apr. 7, 1959
2,909,273	Smith	Oct. 20, 1959

FOREIGN PATENTS

812,197	Great Britain	Apr. 22, 1959



ISOMETRIC VIEW OF BELT FILTER HAVING THREE ROLL DISCHARGE SYSTEM

Defendants Ex. C, R. 780
[Reduced in size for insertion in this Appendix]

A33